The re-entry of mothers in Germany into employment after family-related interruptions: empirical evidence and methodological aspects from a life course perspective

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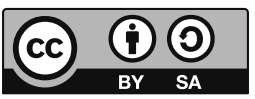

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Katrin Drasch
Nuremberg, June 2013

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1 Introduction

1.1 Background

In the context of women with children's increasing labour force participation in Germany, it becomes especially important to discover how they balance their multiple roles as mothers and employees. Obviously, in Germany it is still difficult to reconcile work and family life; this is consistent with the finding of women's lower fertility rates, especially in the case of better-educated women (Bothfeld et al. 2006a). The employment histories of women with children are rarely a temporal sequence of coexisting employment and family activities but more often an alternating sequence of employment and family phases (Klein and Braun 1995; Lauterbach 1994; Tölke 1989). Overall, the situation of women currently represents a 'difficult balance between family and work'. Women more often have discontinuous employment histories, are rarely continuously employed and also spend more time unemployed compared to men (Dundler and Müller 2006). The upcoming skilled worker shortage moves the compatibility of family and career to the top of the political agenda

Examples from other countries, such as the Netherlands, France and Scandinavian countries, however, show that the low fertility rate and the challenge of balancing work and family life can be counteracted (Lauer and Weber 2003). The importance of supporting women with children in their professional careers has been recognised by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) and the Federal Employment Agency (BA). In March 2008, those actors jointly started a programme called 'Perspektive Wiedereinstieg' to support long-time inactive mothers' re-entry to the labour market.

It is widely known that the interplay between work and family works differently for women and men. For men it can be regarded as synchronous – that is, employment which ensures the financial livelihood of a family and family obligations can take place simultaneously. For women, the connection is asynchronous, because family and work demands constitute competing challenges (Born, Krüger and Lorenz-Meyer 1996; Krüger 1995; Falk 2005: p. 61). This makes family related employment interruptions and re-entries a far more relevant research field for women than for men. In Germany, before the birth of the first child women are usually employed full-time, but after giving birth and a subsequent period of inactivity they are most likely to return to the job market in a part-time position (Bothfeld, Schmidt and Tobsch 2006b). In 1990 the female employment rate was just over 60 per cent; in 2006 it amounted to 70 per cent (Dressel and Wanger 2008). The increase in female employment is attributed to the increasing labour force participation

rate of married women, especially during the non-intensive years before children are born (Kurz 1998; Lauterbach 1994). However, when examining women with children under three years, in 2010 not even one third (31.5 per cent) of this group was gainfully employed. In total, for mothers with children below 15 years, the employment rate amounted to around 57 per cent (Keller and Haustein 2012). Although in the past, the labour force participation of women with children has increased, this trend has not been followed by the volume of work and can mainly be attributed to increasing part-time labour force participation rates (Dressel and Wanger 2008; Kreyenfeld, Konietzka and Böhm 2007a). Also, even 15 years after German reunification, the labour force participation of mothers in the new federal states was much higher than in western Germany. Moreover, in the new states, the dominant form of employment was full-time employment, while in western Germany, most mothers were employed part-time (Kreyenfeld and Geisler 2006). In recent decades, an education-specific change in women with children's labour force participation has taken place. The male breadwinner model, with the father as the primary earner and the mother taking care of the children and the household while not gainfully employed, is practised more frequently by less qualified women than by their highly educated counterparts (Kreyenfeld and Geisler 2006). This is often called educational polarisation of the employment patterns of mothers (Kreyenfeld et al. 2007b).

Female labour force participation has been studied by numerous researchers over the past decades (for an overview see Jaumotte 2003). Female labour force participation at any one point in time can be conceived as the cumulative result of individual careers consisting of the decision to exit employment after childbirth, the duration of the subsequent employment interruption and re-entry behaviour. These processes characterise the so-called 'internal differentiation'[1] of female employment patterns (Lauterbach 1994). In addition, the overall female labour force participation rate is also influenced by the proportion of women with no interruptions or changes in working time. While female labour force participation in general has been examined frequently in the past years, the internal differentiation of female employment patterns has been given less attention in the past decade. In particular, the underlying reasons – such as educational inequality – for the development of inequalities of employment patterns remain unclear to some extent, because cross-sectional data are often used to address questions on educational inequalities. However, the interpretation of cross-sectional data implicitly assumes mechanisms that might seem at first glance theoretically plausible, but are often empirically not testable with such data because one cannot test the underlying

1 This is a literal translation of the German term 'Binnendifferenzierung' (dt.).

mechanisms. This bears the risk of creating an ecological fallacy (Robinson 1950). For example, a diverging influence of educational attainment is found when examining cross-sectional and longitudinal data on employment patterns in Switzerland (Buchmann et al. 2002: pp. 181). To avoid an ecological fallacy, it becomes necessary to trace the micro processes on the individual level which have led to changing labour force participation rates of mothers with different kinds of characteristics, and not the outcome on the macro level.

International results show that the participation rate of women with children is not static, but can be attributed to – for example – changes in social policy (Jaumotte 2003). In addition to individual factors on the micro level, the links between employment and the relevant labour market situation (Bothfeld et al. 2006a), the tax system (Dingeldey 2002; Kreyenfeld and Geisler 2006), child care options (Büchel and Spiess 2002; Keyenfeld and Hank 2000) and the socio-political arrangements of parental leave (Ondrich, Spiess and Yang 1996; Grunow, Aisenbrey and Evertsson 2011) have to be taken into consideration.

In this thesis, I focus on different aspects of women's family related employment interruptions in Germany. More precisely, I examine the re-entry patterns of women related to the birth of a child. Among other things, I am interested in how those patterns changed over time and whether differences can be seen depending on women's educational attainment. I take into account the family policy changes that took place in Germany in the past thirty years. Furthermore, studying Germany allows for examination of the impact of German reunification in 1990 on female employment patterns, especially those from the former GDR. The reunification provides a rare opportunity to study the results of a sudden system change on female employment patterns. However, I am also interested in what kind of job characteristics are of central relevance for women when re-entering the labour market. From a methodological perspective, I will focus on the one hand on the data quality of retrospective data, and on the other hand on experimental data which collected information on preferences. From the results, policy advisors might draw new insights which help to create appropriate labour market and family policies which enable successful re-entry of mothers into the labour market.

Family related employment interruptions and the labour force participation of mothers have been studied by sociologists, economists and demographers (e.g. Grunow, Aisenbrey and Evertsson 2011; Hanel and Riphan 2012; Konietzka and Kreyenfeld 2010). Specialist journalism has focused only recently on mothers' participation in the labour market (e.g. Allmendinger 2010). Recently, in sociology and demography, a cross-country comparison method has been chosen (e.g. Aisenbrey, Evertsson and Grunow 2009; Grunow, Aisenbrey and Evertsson 2011; Grunow and Aisenbrey 2011). With respect to research related to Germany, some of

the results have become out of date and do not account for societal changes such as the German reunification in 1990 or institutional changes in family policy. The economic perspective which accounts for those policy changes often neglects the life course perspective and often excludes what are in my view central dimensions, such as the family sphere. Admittedly, this is often due to data limitations, but it is also caused at least partially by a lack in awareness of the importance of family structure.

Thus, I first bring together two strands of research: the economic perspective that focuses predominantly on the causal effects of policy reforms on employment re-entry, and the sociological perspective that often examines educational stratification in re-entry behaviour but does not take the influence of policy reforms into account. Thus, I examine re-entry after a family related employment interruption from a life course perspective and seek to explain how re-entry is influenced by the macro context of institutions and social policies (Mayer 2009). This has so far been scarce in life course research focusing on family related employment interruptions; to my knowledge, the only examples are Grunow, Aisenbrey and Evertsson (2011) and Ziefle (2009).

1.2 Theoretical perspectives

First, the conceptual framework which is used in this thesis is briefly summarised. This framework is based on the life course perspective. Second, several theories which are used in my thesis are briefly explained. They come from different social sciences disciplines, namely from sociology, economics and psychology.

1.2.1 The life course perspective

The life course perspective has become prevalent in social sciences research. Currently, the collection of longitudinal data required to analyse data from this perspective is regarded as the 'gold standard' (Mayer 2009: p. 413) in social science research. The life course perspective is embedded in social research in North America as well as in Europe. Although the perspectives on both sides of the Atlantic Ocean differ to some extent, I use them interchangeably because they share many concepts and principles (see Marshall and Mueller 2003).

The life course is characterised by a sequence of phases, transitions and events in a number of domains (Mayer 2004). The life course of an individual is embedded in a certain social structure and historical point (Elder 2001). For example, the employment trajectories of women in Germany are embedded in Germany's male-breadwinner model, with a second earner and institutional regulations that promote

lengthy employment interruptions for mothers. Transitions mark the change from one phase to the other, e.g. from employment to non-employment and vice versa, for example, when examining mothers' re-entry to the labour market. Employment trajectories or histories denote a sequence of employment and non-employment phases. Those sequences are part of the overall life course, which also consists of other types of trajectories, such as partnership histories. Transitions are induced by events, with the initial state replaced after a certain period by another state (Elder 2001). The entire life history of an individual, thus the preceding events and processes, are then used to explain the current state of an individual.

One of the most central transitions in the family sphere, especially for women, is the transition to parenthood (Karraker and Grochowski 2005). This transition is often immediately followed by another transition: from employment to labour market inactivity. This creates a certain path dependency of individual life courses, meaning that without a transition to parenthood, the transition to family related employment interruption is not likely to take place. Thus, decisions in the life course build on each other and establish an endogenous causal relationship (Mayer 1987). After a phase of inactivity, however, often employment re-entry – either in marginal, part-time or full-time employment – occurs. So, in this thesis I focus on the phase of family related employment interruptions and subsequent transitions back into employment.

The central principles of the life course (Elder, Johnson and Crosnoe 2003) relevant for this thesis are: the principle of life-span development, the principle of timing of events and transitions, the principle of linked lives, the principle of time and place, and the principle of agency (see also Blossfeld and von Maurice 2011). The principle of life-span development calls for a focus on pathways of individual life courses, e.g. women in the course of family formation and employment. The principle of timing of events and transitions indicates that life transitions and events vary according to their timing in a person's life, but also with respect to the period and cohort in which an event is embedded. Thus, it examines the intersection of age, period and cohort effects. From this point of view one can examine the employment interruptions of women and how they are embedded in their life trajectories, but also in the historical period and in the broader context of their birth cohort. Another principle refers to linked lives and indicates that individuals are embedded in a broader social structure, such as the family. So, besides the individual, the partner might also influence both the decision to re-enter employment and the original decision to interrupt employment after the birth of a child (Drobnič 2003; Moen 2003). The principle of agency examines human agency and the resulting individual development. The principle of agency in sociology can also be linked to the principle of methodological individualism, meaning that

aggregated outcomes on the macro level, e.g. the labour force participation of mothers, have to be reconstructed via the occupational choices of mothers on the individual level (Coleman 1990; Weber 1922).

The most popular principle, the principle of time and place, accounts for the fact that employment careers are 'embedded and shaped by the very specific historical times and places they experience' (Blossfeld and von Maurice 2011: p. 24). Several approaches with which to address time become of central relevance to life courses. Within this principle, three effects can be distinguished (Elder 2001; Mayer and Huinink 1990): age, cohort and period effects. The age effect, which can also be seen more generally as a duration effect, refers to the fact that changes are determined by the age of a mother or another duration variable, such as the duration of a family related employment interruption. As individuals get older, changes to another state become more or less likely. The period effect indicates that certain historical conditions, such as for example German reunification, have an influence on individual's life courses in a similar manner. The third effect – the cohort effect – refers to effects that can be attributed to a certain cohort. This cohort can be affiliation to a specific birth cohort, but also, for example, affiliation to a labour-market re-entry cohort. Individuals belonging to the same cohort pass through a specific point in time at the same time and thus might behave similarly.

One of the aspects that shape life course regimes is the degree of women's career involvement (Mayer 2004). The macro level outcome of changing labour force participation of women with different levels of educational attainment is seen as the result of changing influential conditions described above. However, they influence the micro level by shaping individuals' orientations to actions, and subsequently also the actual behaviour of individuals (Coleman 1986). The macro level outcome of mothers' changing labour-force participation is thus viewed as the outcome of individual actions constrained by the women's normative, institutional and structural contexts (Nee and Brinton 1998). Thus, women are also expected to be affected by changing conditions.

An important role, which has been neglected for a long time in life course research, is played by institutions. According to Mayer (1990b), institutions enable transitions between different phases of the life course. Laws and social policies on the macro level institutionalise individual pathways (Mayer and Müller 1986). Also, institutions socialise individuals and individuals adapt towards their social environments (Mayer 2004). Welfare state institutions regulate entry and exit into and out of certain phases of life. So, new kinds of statutes and events are institutionalised by the provision of the welfare state (Brückner and Mayer 2005). So far, the economic perspective has focused predominantly on the causal effects of policy reforms on the return to work, while the sociological perspective

examined educational differences in re-entry behaviour. So, a new direction of life course research needs to be incorporated, to examine the internal dynamics of life courses and to seek to explain how they are 'shaped by the macro-contexts of institutions and social policies' (Mayer 2009: p. 426). Also, sudden system changes such as the German reunification provide the possibility to test the foundations of the life course perspective (Mayer 2009).

Life course research requires the use of longitudinal data and techniques of analysis that enable taking into account the duration of events and the impact of previous events and transitions on the current situation. This duration is dependent on the characteristics and resources of the individuals, but also on macro level characteristics such as parental leave legislation. In order to examine family related employment interruptions, longitudinal data on employment trajectories as well as on interruption phases become necessary. However, other types of events also become relevant – for example, marriage and the transition into marriage, or when an individual finishes school or training activities. Other parallel events can also have an influence on the duration of events (e.g. the birth of another child in a parental leave phase).

In sum, the life course perspective presented above is used as a theoretical framework. Due to its central focus on 'time', it is especially suitable for examining family related employment interruptions and its durations and re-entries. What has to be noted, however, is that the life course perspective is not connected to any specific theory of human behaviour at the individual level, because it still lacks a consistent theory (Mayer 2009). In principle it can be combined with any theory on the individual level. This potentially opens up the possibility for an interdisciplinary approach being used to study family related employment interruptions and re-entries, which is so far still scarce in research (Mayer 2000). In the following, the theoretical approaches used in this thesis are presented and theories from different disciplines are briefly sketched.

1.2.2 Micro level theories

This thesis uses several theoretical approaches that come from sociology, economics, psychology and survey methodology. So, it is embedded in the general field of social sciences. Also, several life domains are touched by this thesis: it includes the labour market as well as the household and partnership context, and thus includes approaches from family as well as labour market sociology.

Social sciences provide theories on rational decision making and thus serve as underlying principles or paradigms of theories assuming the rational behaviour of individuals. Those can be divided into *narrow and wide rational choice theories.*

Wide rational choice theories relax some of the assumptions put forward by narrow rational choice theories, meaning that narrow rational choice theories can be classified as special cases of wide rational choice theories (Opp 1999). One theory that can be classified as a *narrow rational choice theory* is the *neo-classical labour supply theory*. Within this theory, the rational decision of a mother to re-enter employment after a family related employment interruption depends on the relationship between her achievable market wage and her reservation wage. The reservation wage – or, in other words, the opportunity cost – depends on the value of the time a woman perceives in the household. A woman will only take on work if her market wage is higher than her reservation wage. A dynamic perspective also takes the age of the children into account, because child age influences both availability and costs of child care (Leibowitz, Klerman and Waite 1992).

Both market and reservation wage can be connected to several characteristics of a woman – for example, her number of children or her partnership status (Weber 2004). One of the most central characteristics is level of educational attainment, which can in turn be linked to *human capital theory.* This theory assumes that the productivity of an individual depends on their level of schooling and training. Within this theory it is also postulated that human capital is not fully transferable over a longer period of time. So, *human capital depreciation*, for example during family related employment interruptions, also becomes relevant (Mincer and Ofek 1982; Görlich and de Grip 2009). However, in these kinds of economic theories it is difficult to account for preferences or tastes, although attempts are made to do so. Here, *wide rational choice theories*, which are often used in sociology, become relevant. It can be assumed that human behaviour is only rational to some extent, and is also influenced by norms and values that are incorporated in a society. Thus, aspects of *socialisation* during childhood and adolescence become relevant.

Economic theory often reduces a multi-faceted decision to one based on monetary components only. This shortcoming, however, has already been noted by economics itself. Becker (1991) recognises that women with children seek jobs that are mother-friendly. From an economist's perspective, Rosen (1986) generally assumes that a trade-off between wages and non-monetary job characteristics becomes relevant. This perspective has also been taken up by the sociologist England (1992) and will be used in this thesis.

Other disciplines taken into consideration are *cognitive psychology* (see Conway 1996; Conway and Pleydell-Pearce 2000 and others) and *survey methodology* (see for example Groves et al. 2009). *Cognitive psychology* becomes relevant when examining family related employment interruptions from a life course perspective, due to methodological problems with the collection of life course data. Life course data are often collected retrospectively by asking respondents about their past

experiences and events that have happened to them. When collecting those data over a longer time span they are prone to recall error, because the human memory is not able to remember all experiences correctly. Thus, techniques and tools to improve autobiographical human memory become relevant when collecting life course data. This is then, in turn, connected to *survey methodology*. In addition, the question of rational decision making in the context of family related employment interruptions and re-entries becomes relevant. Using 'traditional' longitudinal data, one is only able to examine realised re-entries, and not at not-realised re-entries. This, however, becomes possible by applying a factorial survey, a technique that confronts the respondents with fictional situations and continues to ask about their behavioural intentions.

In sum, this thesis uses the ongoing fruitful dialogue between the different disciplines of family and labour market sociology and labour market and family economics to examine at family related employment interruptions and re-entries. It also tries to avoid explicit references to one or the other discipline, but instead seeks to integrate them with each other. This also takes up the ongoing discussion in (social) sciences about going beyond disciplinary borders (Mayer 2009). Although different disciplines have examined similar research questions, they have often also used different theoretical concepts and overlooked research results in other disciplines. To avoid this, my strategy can give fresh impetus for all relevant disciplines.

1.3 Research questions and contributions

In this thesis, I examine family related employment interruptions and re-entries in Germany. I attempt to answer three general research questions. In answering these research questions, I attempt to make several contributions to existing research. The first question is the following:

1.3.1 How did institutional settings and cultural preferences shape the family related employment interruptions of mothers in Germany in the past three decades?

In answering this research question, I first add to existing literature by studying a much longer time span than has been previously used. Previously, studies often concentrated on selected birth cohorts. (Admittedly, this was often due to data unavailability.) Second, I contribute to the ongoing research debate by taking institutional settings and changes explicitly into account when studying individual life courses. Studying the influences of institutional changes has often been the

focus of micro-economic evaluation studies, but has been largely neglected by sociology so far. Third, I compare East and West Germany before and after German reunification with the aid of longitudinal data which was collected retrospectively. This is so far scarce in research.

The educational differences of re-entries are studied in chapter 2. Taking the perspective that the interplay of institutional and social developments creates a specific set of possibilities and restrictions on employment histories, I examine in family related employment the interruptions and re-entries that took place in Germany in the past three decades, starting in 1980. First, I study mothers' labour market re-entries. Two perspectives are studied: one comparing women with different levels of educational attainment and one examining changes over the past three decades. Those perspectives are also combined. I aim to investigate whether these possibilities and restrictions may have developed differently for different educational groups. The underlying reason why this might be the case is that the institutional setting, in the form of parental leave legislation, underwent several severe changes in the past decades.

The major research interest comes from the fact that in recent decades, a number of family policy changes have taken place. Family policy regimes can be divided into regulations on child benefits, maternity and parental leave, and employment protection during leave and working times (see Kreyenfeld 2001: pp. 48). Furthermore, different regulations were in effect in the German Democratic Republic (GDR). A detailed discussion is omitted here, because the major regulations and changes of regulation for the Federal Republic of Germany (FRG) are discussed in chapter 2 and a comparison of the regulations in the FRG and GDR is presented in chapter 3. In principle the regulations, except for maternity leave, are gender neutral. However, parental leave is still mostly taken by women. A short overview of parental leave taken by men is given in section 3.2.3.

In chapter 3, I address how family related employment interruptions were shaped in the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR) and, after the German reunification, in East and West Germany. I focus on East and West Germany before and after the German reunification because I assume that different mechanisms are at work for different types of political systems and welfare states. Study of those different systems becomes even more relevant when bearing in mind that the institutional regulations of the FRG, for example those related to parental leave schemes, were rapidly transferred to the states of the former GDR. Also, a different general social policy in both German states must be taken into consideration. While in the FRG the male breadwinner, with a second (part-time) earner, was supported, in the GDR full-time employment of both father and mother was promoted. Thus, in the FRG it was common that

mothers stayed out of the labour force for a substantial time period – often several years. In turn, the parental leave system in the FRG supported a return to the labour force around 12 months after giving birth. Within this context, one group becomes particularly interesting to study: women who grew up in the GDR and thus were socialised within this system, but moved to the one of the old federal states after the German reunification. One central question that arises in this respect is whether the attitude towards the labour force participation of mothers or parental leave legislation is more important.

The data used to study the research questions are collected retrospectively. This always brings up the question of the quality of those kinds of data. Therefore, the second research question addressed in this thesis picks up a methodological perspective:

1.3.2 To what extent can retrospective life course data provide reliable information on educational trajectories, employment histories and employment interruptions?

In answering this question, I contribute to survey methodology by looking at the effectiveness of a special data editing tool that can be used during a survey and in co-operation with the interviewer and the respondent. This tool was first developed by Matthes, Reimer and Künster (2005) in the context of the German Life History Study. I contribute to existing literature by explicitly linking insights from cognitive psychology about the functioning of human autobiographical memory with techniques and tools that can be used in surveys to improve data quality with respect to memories about events and their dating within historical time. In a subsequent step, I also add another data improvement step: post-interview survey data editing. More precisely, I check for the robustness of selected empirical analyses related to the first research question. This is also unique in survey methodology and seeks to contribute to the discussion about whether costly and time-consuming editing procedures after interview are indeed necessary.

The data editing tool aforementioned was used for the first time in a large-scale general population survey for the collection of the IAB-ALWA data (Drasch and Matthes 2013). Previously, the functionality of this tool had been tested only in experimental studies (Reimer and Matthes 2007). It is based on the principle of Event History Calendars (Belli 1998) but to a large extent it standardises procedures to resolve inconsistencies in respondents' reports. It does so by relieving interviewers from recognising inconsistencies within respondent's reports immediately during the interview. I first examine at what types of events are especially error-prone because they are omitted without the help of the data editing tool or they are misdated in

month and/or year of occurrence of the event. Second, I compare selected empirical analyses related to my first, more substantial research question at several stages of the data editing process. Comparing results using different data is interesting because family related employment interruptions emerged as problematic in the IAB-ALWA study. It turned out that designing a survey instrument appropriate for addressing family related employment interruptions is not an easy task, because the event type appeared to be difficult to remember.

This research question is studied further in chapters 4 and 5 of this thesis. Data quality has been questioned by several researchers because human autobiographical memory is often erroneous (for an overview of this, see Schröder and Börsch-Supan 2008 or chapter 4 of this thesis). I explain in detail how attempts have been made to overcome the problem of data quality in the dataset used for the analyses, the IAB-ALWA data (Working and Learning in a Changing World) (Antoni et al. 2010, 2011) (chapter 4). In chapter 5, I show the impact of the strategy for selected results in the empirical analyses of chapter 2.

The third research question picks up a theoretical question and attempts to answer it with a specific methodological design:

1.3.3 How important are job amenities, compared to wage offers, for the re-entry decisions of mothers?

In answering this question, I contribute to existing literature by addressing the relevance of non-pecuniary job characteristics on the decision to accept or decline a job offer. I do this by using a factorial survey as an alternative to standard research questions. Previous research has not often attempted to answer this question due to data unavailability on not-realised re-entries (Devine and Kiefer 1991). I take up the finding that mother's wages are lower compared with women withouth children. This could be due to the fact that mothers are willing to pay for job amenities because they want to combine labour and family work. So, they are eventually willing to accept wage deductions but get jobs with more favourable characteristics to reconcile family and work. So, I first use the theory of compensating wage differentials (CWD) to theorise these assumptions and derive hypotheses on the behaviour of women. This is to my knowledge unique in research because so far, the re-entry process has not been examined directly. The empiral results indeed suggest that for mothers job amenities seem to be important and wages are not the only decision criterion when re-entering the labour market.

The research question takes up a slightly different perspective and uses data from the evaluation project 'Perspektive Wiedereinstieg' (for further details see chapter 6). The ongoing evaluation of this project was carried out by the Institute

for Employment Research (IAB) from March 2009 on behalf of the German Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) and in cooperation with the Federal Employment Agency (BA). The quantitative component of this evaluation study consisted of telephone interviews with project participants and a comparison group of prospective re-entrants who were registered with the BA and who were interviewed two or three times during the course of the evaluation. The data include information on returners' employment situation and their experiences with employment re-entry. Furthermore, in the telephone interview, they were also asked to participate in an additional online survey, which was designed as a quasi-experiment in the form of a factorial survey. The design and characteristics of a factorial survey will be explained in detail in chapter 6.

1.4 Data and methods

This thesis combines several data sources to address the selected research questions. First, it uses longitudinal data from the IAB-ALWA study, a retrospective life-history survey conducted in Germany in 2007 and 2008 on behalf of the Institute for Employment Research (IAB) (Antoni et al. 2010, 2011; Kleinert, Matthes and Jacob 2008). The IAB-ALWA respondents are now integrated in the adult cohort of the National Educational Panel Study (Allmendinger et al. 2011). This survey is based on a nationally representative sample of the German resident population and was collected through computer-assisted telephone interviews. The longitudinal dataset provides information on 10,000 German residents born between 1956 and 1988. It systematically collected retrospective information in major life domains such as schooling, vocational training, employment or unemployment. More importantly, the dataset also contains retrospective information about partners, parental leave and children. In all, 5,000 episodes of parental leave can be analysed. Those can be combined, for example, with information on employment, unemployment or partnership histories, but also with external macro data such as the regional unemployment rate (Antoni et al. 2010).

Compared with other previously used datasets, such as the GSOEP (see Kurz 1998; Weber 2004; Ziefle 2004), the German Life History Study (GLHS) of the Max Planck Institute for Human Development (see Lauterbach 1994) and the process-produced data from the Federal Employment Agency (see Bender, Kohlmann and Lang 2003; Schönberg 2008), ALWA offers several advantages: for example, because parental leave periods were addressed directly in ALWA, family related employment interruptions can be clearly identified. In addition, it provides information regarding the employment and family context at the time of return. The dataset includes family related employment interruptions up to

the time of the latest legal developments concerning parental leave in 2006, and contains information pertaining to interruptions from past decades. Thus, the data enable the comparison of different cohorts and the modelling of changes over time. In addition, the ALWA study contains a sufficient number of cases to enable comparisons among GDR and FRG, as well as East and West Germany.

The event data are analysed using discrete-time event history models (Singer and Willett 2003). For most analyses, non-parametric proportional hazards (PH) models that account for time-constant and individual specific unobserved heterogeneity are estimated (Jenkins 1995). They allow for random effects and take the multiple-spell structure of the data into account. The coefficients reflect the conditional probability of event occurrence at time interval ti given that the event had not occurred until time interval t_i - 1. I allow the transition rate to vary across time intervals and estimate the PH as a discrete-time approximation to the piecewise constant exponential model (PCE) often used for continuous time. To study the data quality of the retrospective reports, logistic regression models for rare event data are used (King and Zeng 2001).

Second, data from the evaluation project 'Perspektive Wiedereinstieg' (perspectives on re-entry) (Götz et al. 2010; Götz, Ruppe and Schreyer 2012) is used. Third, with a subsample of those respondents, I conducted an online survey that used a factorial survey design. In addition to participants of the evaluation project, a comparison group of women registered with the Federal Employment Agency (BA) as unemployed or actively searching for work was interviewed. Those women had to have had interrupted employment for at least one year. Furthermore, they had to be classified as 'employment returners' (Berufsrückkehrerin). This status gives women and, in principle, also men access to necessary benefits (according to § 8b of social security code III) to promote their return to employment after a family related employment interruption.

I use multilevel modelling (cf. Rabe-Hesketh and Skrondal 2008) to analyse the factorial survey data, and thus take into account that in a factorial survey, respondents have to answer several different vignettes. Thus, conventional OLS regression is not an appropriate method to analyse factorial survey data, because the observations are correlated when they come from the same respondents. This violates the independence assumptions necessary for standard OLS regression models.

The datasets are augmented with regional data from the Federal Employment Agency (Bundesagentur für Arbeit, BA) and the Federal Statistical Office (Statistisches Bundesamt) on e.g. regional unemployment rates and child care coverage. Finally, to look at attitude changes in East and West Germany, longitudinal data from the German General Social Survey (GGSS; Wasmer, Scholz and Haarmann 2008) are

examined. More information on the datasets used will be given in the respective chapters.

1.5 Outline of the thesis

Besides this introduction, the thesis consists of five chapters (chapters 2 to 6), including one chapter (chapter 5) that links the general essay in chapter 4 to the research topic and a concluding chapter. Although each of the four essays constitutes a separate article, they are all related to one another, and their presentation follows a logical order. I first address the substantial questions (chapters 2 and 3) related to family related employment interruptions and re-entries in Germany. Then, I study the methodological questions related to the quality of retrospective life course data (chapters 4 and 5). Chapter 6 sheds light on the decision process regarding employment re-entry, which is difficult to examine from a narrow life course perspective. In this chapter, a factorial survey, as an innovative method of data collection, is used. Chapter 7 sums up the main finding and proposes an agenda for future research.

Overall, this thesis attempts to add to current substantial as well as methodological literature: substantially, because it investigates a popular topic in social sciences from a different perspective by focusing on the role of institutions and social policy and their impact for different groups of women, e.g. differently educated women, and methodologically, because it also addresses the question of data quality of retrospective reports and its impact on the robustness of selected research results. This attempts to create a better empirical basis for future research.

2 Educational attainment and family related employment interruptions in Germany: Do changing institutional settings matter?[2]

Abstract

Cross-sectional studies show that in West Germany the labour force participation of mothers with different levels of educational attainment has changed during the past few decades, the most severe decrease of labour force participation has been observed for less-educated mothers whereas better-educated woman were less affected. In this chapter, one potential underlying mechanism is examined: re-entry of mothers into the labour market after a period of inactivity. I argue that, in addition to societal changes, reforms in parental leave legislation could be responsible for educational differences of mothers' employment. Using retrospective life course data from the IAB-ALWA study, I find evidence that women with different levels of educational attainment have different patterns of re-entry into the labour market. Furthermore, changes of parental leave schemes play a crucial role for re-entry. Some evidence of educational polarisation of re-entry behaviour is found from 1992 onwards.

JEL classification: J21, C41

Keywords: maternal employment, parental leave legislation, discrete-time event history analysis

2.1 Introduction

In Germany, the participation of mothers in the labour market still closely follows traditional gender roles. Moreover, welfare institutions are to some extent still based on these roles. This leads to a prevalence of the modified breadwinner model (Bothfeld, Schmidt and Tobsch 2006b). Women are usually employed full-time before the birth of the first child, but after giving birth and a subsequent period of inactivity, they are most likely to return to part-time positions.[3] However, the labour

2 This chapter is authorized by the original copyright holder Oxford University Press and is an extended version of: Drasch, Katrin. forthcoming. Educational Attainment and Family Related Employment Interruptions in German: Do Changing Institutional Settings Matter? European Sociological Review. Online first 2012, 15 p. doi: 10.1093/esr/jcs076. With kind permission from Oxford University Press. All remaining errors are mine.

3 In West Germany, in 1996 around 55 per cent of mothers were employed. This rate increased to 59 per cent in 2009 (Keller and Haustein 2012). The rate of children less than three years in day care increased from two per cent in 1990 to 12 per cent in 2008 (Goldstein and Kreyenfeld 2011). The OECD Family database (OECD 2011) offers some more stylised facts about female employment, maternal employment and children in day care. Buchholz and Grunow (2006) provide an overview over the historical development which influenced women's employment in West Germany in the past decades.

force participation of mothers with different levels of educational attainment has changed during the past few decades. Although full-time employment rates have declined in all educational groups, the most severe drop has been observed for less-educated mothers. In summary, there is a general tendency towards an increasing educational divide in mothers' employment (Konietzka and Kreyenfeld 2010; Kreyenfeld, Konietzka and Böhm 2007a).

The diverging influence of education can be linked to changes in family policy. Incentives for employment interruptions changed in different ways for women with different levels of education. In Germany, as in many other European countries, parental leave legislation has been reformed several times during the past decades. Firstly, the financial compensation of family related employment interruptions was altered several times. Secondly, the potential duration of parental leave with the possibility to return to the same employer was gradually extended. Therefore, it becomes necessary to trace the micro processes on the individual level that might have led to the educational divide in mothers' employment.

These parental leave regulations are generally viewed as generous compared to other European countries like France or compared to the US. They also lead to unintended consequences like the dismissal of women shortly after their return to the former employer (Schönberg and Ludsteck 2007). Also the effects on the labour market are ambiguous. On the one hand this liberal legislation is aimed at creating labour force attachment of mothers. On the other hand this legislation is viewed as an incentive for new mothers to leave the labour force (Puhani and Sonderhof 2011).

Based on the assumption that the interplay of institutional and societal developments creates a specific set of possibilities and restrictions for female employment patterns, this chapter aims at examining employment re-entries of mothers after family related employment interruptions in West Germany since the early 1980s. It investigates whether interruption patterns have developed differently for women with varying levels of educational attainment – a trend that could be responsible in the long run for creating inequalities between mothers with different levels of educational attainment, for example, a diminished old-age income. The chapter aims to explain from a life course perspective how re-entries are influenced by the macro context of the institutional framework and social policy (Mayer 2009). Retrospective life course data from the IAB-ALWA study (Working and Learning in a Changing World) (Antoni et al. 2010, 2011) are used for the analyses. These data allow exploring the influence of several reform of parental leave legislation from 1979 until 2006 except for the last reform in 2007. The following research questions are addressed: firstly, how does the institutional setting influence re-entry probability? Secondly, do educational differences affect re-entry? Thirdly, is there an educational polarization of re-entry behaviour?

The chapter is structured as follows: the next section provides an overview on the related research regarding family related employment interruptions. Subsequently, I briefly explain the institutional and societal changes in the past three decades. In the third section, a theoretical framework that takes up insights from human capital theory and labour supply theory is outlined and hypotheses on re-entries are derived. In the fourth section, the data, the analysing strategy and the variables are described. In the fifth section, results are presented. Finally, the findings are summarised and discussed.

2.2 Previous research on employment interruptions

Educational attainment is an important characteristic influencing employment re-entry of mothers after a family related employment interruption. However, research results concerning the effect of education in West Germany are ambiguous: on the one hand, a positive effect on the probability of re-entry can be found. For instance, educational attainment has a positive effect for the birth cohorts 1939–1941, but only for West German women with a university degree and not for women with other types of educational attainment (Buchholz and Grunow 2006). A positive effect of education is found for re-entry into part-time employment, but not for re-entry into full-time employment (Blossfeld, Drobnič and Rohwer 2001). On the other hand, the influence of education often disappears when other characteristics are controlled for, such as socio-economic status, number of children or mothers' birth cohort (e.g. Klein and Braun 1995). Furthermore, the effects of education disappeared after the statutory parental leave period has expired (Kurz 1998). Moreover, no significant effect of mother's educational level is found as a consequence of changing parental leave regulations (Grunow, Aisenbrey and Evertsson 2011).

Cohort differences have been studied by several authors (see Bender, Kohlmann and Lang 2003; Grunow, Hofmeister and Buchholz 2006). Younger marriage cohorts exhibited an increasing re-entry probability after an interruption (Blossfeld, Drobnič and Rohwer 2001). Aisenbrey, Evertsson and Grunow (2009) detected lower cumulative return probabilities for women who gave birth to a child between 1987 and 1992 than for women who delivered in the early 1980s. These findings point to a possible relevance of policy effects. Parental leave regulations are only taken into account from a sociological perspective by Gottschall and Bird (2003), Bird (2004) and Schaeper and Falk (2003). These studies showed that the expiration of the leave period has a significant effect on return probabilities. However, these results are not based on a representative sample of women.

Research from economics shows the relevance of institutional changes for the duration of family related employment interruptions. Ondrich et al. (2003) found

that extending the potential duration of parental leave leads to a postponement of re-entry, which corresponds in length to the prolongation of the duration of permitted parental leave. Weber (2004) reported that extended parental leave durations have a negative effect on the probability of return to the labour market. Summarising, differences in educational attainment on re-entry were studied but mostly institutional changes were not taken into consideration. Longitudinal studies for Germany on the use of parental leave, which focus on differences in educational attainment of mothers and its changes over time, are to my knowledge non-existent so far with the exception of Grunow, Aisenbrey and Evertsson (2011).

2.3 Institutional and structural changes in the German welfare state: Changed conditions for younger cohorts?

According to Esping-Andersen's welfare state typology (1990, 1999), Germany is classified as a conservative welfare regime with a high degree of familiarism meaning that the family is largely responsible for caring activities. Additionally, Germany had been characterised by a strong male breadwinner ideology. This model promotes that mothers stay at home to raise their children, whereas fathers are gainfully employed. In the past decades, this model was gradually replaced by a modified male breadwinner model with a second earner (Crompton 1999). In summary, Germany is currently moving towards an adult worker model that encourages all individuals to be active in the labour market (Lewis 2002).

Presumably, the trend towards the adult worker model was initialised by changes in the labour market and family policy during the past decades (see Table 2.1). From 1952 onwards, a statutory maternity leave period of around three months was guaranteed to all working mothers. Subsequently, a parental leave phase of six months was introduced for working women in West Germany in July 1979. The potential parental leave period was extended to ten months in 1986 and to women and men, regardless of their employment status. Parental leave was further extended three times: to 12 months in 1988, to 15 months in June 1989, and to 18 months in June 1990. Benefits were paid for the entire leave duration.

Until 1991, parental leave was always paid leave, but in 1992 the payment duration of childrearing benefits was disconnected from the maximum duration of parental leave. The job guarantee was set to 36 months, whereas the payment duration remained at 18 months. In 1993, the payment duration was extended to 24 or to 36 months depending on the federal state. In 2001, the maximum duration of parental leave was set to 24 months. However, eligible women with a family income below a certain threshold had the opportunity to actively choose higher monthly payments for a shorter period of 12 months. This was intended to create

financial incentives to shorten the interruption period for families with lower levels of income (Bothfeld 2005). In the last reform of parental leave legislation in 2007, childrearing benefits payments were replaced by earnings-replacement benefits marking a paradigm shift in German family policy (Henninger, Wimbauer and Dombrowski 2008). In summary, the regulations sustain and institutionalise interrupted female employment patterns (Grunow, Hofmeister and Buchholz 2006).

Table 2.1: Parental leave legislation in West Germany (selection), 1979–2007

Date	Name of leave (German name in paranthesis)	Duration of leave with job guarantee (in months)	Duration of maternity/ paternity benefit (in months)	Eligibility of benefit with respect to gender/ employment status	Amount of benefits**
7/1979–12/1985	Maternity leave *(Mutterschafts-urlaub)*	6	6	Employed women	Proportional to previous earnings, max. 383 € (until 1983)/261 € (from 1984 onwards)
1/1986–12/1991	Short parental leave *(Erziehungs-urlaub – kurz)*	12–18 (gradual extension)	12–18 (gradual extension)	Men and women regardless of employment status	307 € for six months; thereafter means tested max. 307 €
1/1992–12/2000	Long parental leave *(Erziehungs-urlaub – lang)*	36	18 (until 12/92)/24 (from 1/1993)*	Men and women regardless of employment status	307 € for six months; thereafter means tested max. 307 €
1/2001–12/2006	Reformed parental leave *(Elternzeit)*	36	12/24 (active choice of the woman/family for 12 months)*	Men and women regardless of employment status	450 € (for 12 months) or 300 € (for 24 months) means tested
1/2007–present	Parental benefits *(Elterngeld)*	36	12/14 (if second carer takes parental leave), earnings replacement benefit*	Men and women regardless of employment status	Depending on income around 2/3 of foregone net income (300 €–1800 €) – for low incomes up to 100 per cent

Source: Adaptation of Bird (2004: pp. 311), Gottschall and Bird (2003), Kreyenfeld (2001) and respective legislative texts.

* In some federal states (e.g. Baden-Wuerttemberg, Bavaria, and Rhineland-Palatinate) a third year is paid. This additional payment is also bound to specific regulations.

** All amounts were converted and rounded into euros to ensure a better understanding.

In addition, labour market policy changes took place. In the late 1990s, another paradigm shift of German labour market policy from a providing to an activating welfare state was observed (Lewis 2002). Priorities were set on labour market integration by gainful employment (Schratzenstaller 2004). For mothers, these

priorities imply that caring was no longer regarded as a substitute for gainful employment. Instead, combining work and motherhood is emphasised. These priorities were also reflected by the increasing efforts to implement public child care facilities for infants and kindergarteners.

One major problem is associated with these changes. It can be argued that the policy changes do not affect the whole population homogeneously but are often targeted at certain subgroups within the population (Stadelmann-Steffen 2007). As for example parental leave allowance has become income based, the latest reform of the German child allowance system favours parents with higher income over parents with lower income.

The institutional changes have been accompanied by several structural changes that took place in Germany in the past decades. These changes are often summarised under the heading of social change (Geißler and Meyer 2006). In sum, it can be assumed that the changes have altered the societal conditions for family related career interruptions. On the one hand, changes in the educational system took place. Due to the educational expansion in post-war Germany access to higher education was opened up for large parts of the population and education is no longer seen as a privilege of the rich (Müller, Steinmann and Schneider 1997). On the other hand, a number of changes took place on the labour market. German is now regarded as a knowledge society and knowledge can be seen as one of the key features of social inequality (Drucker 1994; Heidenreich 2002). This developed has led to an upgrading of the occupational structure (Hillmert and Jacob 2003) meaning that in sum more and more better qualified employees are needed in order to fulfil the requirements of technical and technological change. This leads to an increasing unemployment among the unskilled and semi-skilled employers (Reinberg and Hummel 2005). This was additionally accompanied by a general trend of an increasing unemployment rate (Blossfeld et al. 2005). Also, in a European comparison the gender difference in employment rates between women and men were much higher for low-skilled than for high-skilled women (Debacker 2005).

Another relevant structural component is of course child care availability. In sum, child care in Germany is scarce especially for children under three years are still very low even if there are large regional differences. Historically, they are much higher in the new federal states and in urbanised regions. For children in kindergarten age at least part-time day care is sufficiently available. However, the 'dilemma of child care' (Kurz 1998: p. 64) is continued for children school age because half-day schooling until noon is still the dominant form schooling. Thus, without additional caring arrangements working more than a few hours per week is still not supported by societal arrangements.

2.4 Theoretical considerations and hypotheses

In theoretical terms, the chapter is based on the rational choice perspective (Coleman 1986, 1990) integrating assumptions from human capital theory (Becker 1993) and a dynamic version labour supply theory (Leibowitz, Klerman and Waite 1992). Changing institutional conditions exert influence at the micro level by shaping individuals' preferences, and thus they may affect also their actual behaviour (Coleman 1986). Individual choices are constrained by certain rules (Ingram and Clay 2000) and by the normative, institutional and structural context in which they are embedded (Nee and Brinton 1998; Granovetter 1985).

Statutory regulations affect the decisions of women intending to return to the labour market (Berger and Waldfogel 2004). The end of the parental leave period denotes a horizon up to which the employment contract with their previous employer remains in force (Ondrich et al. 2003). At this point, a woman must have found adequate child care and arranged work and family life to be able to return. This horizon is presumed to exist independent of the maximum duration of parental leave. As child care is in short supply in West Germany, particularly for pre-kindergarten children, it is to be expected that women postpone re-entry until their parental leave period has expired. Within the labour supply framework, owing to the job guarantee, the opportunity costs of staying at home are lower for the mother within the parental leave period than afterwards. In consequence, it can be assumed that most mothers use the maximum duration of parental leave irrespective of its actual length (Ondrich et al. 2000, 2003; Weber 2004). This 'horizon effect' leads to my first hypothesis: mothers postpone employment re-entry until the legal parental leave period expires (horizon hypothesis). Accordingly, I expect that the parental leave extensions between 1979 and 1992 have led to longer interruptions.

The central idea of human capital theory is that investment in education accumulates knowledge and skills. General human capital is accumulated during schooling, vocational, and higher education. Specific human capital is acquired through employment experience. These capabilities have a positive influence on individual productivity and, consequently, on expected wages (Becker 1993). Thus, higher educated women have better opportunities in the labour market and can earn higher wages. This wage potential makes higher educated woman more reluctant to forego their earnings. Therefore, females with a higher potential market wage will substitute domestic work for market employment earlier and with higher probability (Leibowitz, Klerman and Waite 1992). All in all, educational attainment stratifies labour market re-entries of mothers and leads to the second hypothesis: I expect better-educated mothers to have a higher return probability following a

related employment interruption and to return earlier than less-educated mothers (education hypothesis).

Finally, I assume that the effects of educational attainment and parental leave legislation are interrelated because political reforms may have altered the incentives to return to the labour market for differently educated women. Firstly, all working women were affected by the extensions of the parental leave duration that took place between 1979 and 1992, irrespective of their level of education. Secondly, time spent outside the labour market reduces human capital, as acquired knowledge is not fully transferable over time (Kunze 2002; Mincer and Ofek 1982). Thirdly, during the period of inactivity, labour market experience is not accumulated anymore. Less-educated women are not affected by human capital depreciation as much as better-educated women because, by definition, they do not have a high stock of human capital even before they interrupted work. In turn, highly educated women who have invested more in their human capital in the past may be driven more to sustain their status quo. These investments induce them to return earlier, no matter where the horizon of maximum parental leave duration is fixed – a display of their rational decision to maintain their earnings potential. Higher potential wages also allow them to afford external child care and compel them to return earlier, regardless of the potential parental leave duration. In contrast, less-educated woman have a lower earning potential, which is further diminished by the cost of child care (Leibowitz, Klerman and Waite 1992). This earning potential leads to the rational decision not to re-enter the labour market until the horizon is reached. The expiration of the maximum parental leave duration then pushes mothers back into employment.

Consequently, the extension of the potential parental leave duration between 1979 and 1992 may have been especially unfavourable for less-educated women. In addition, structural changes in the labour market have worsened the situation for less-educated mothers (Konietzka and Kreyenfeld 2010). In summary, the following hypothesis is presented: the extension of parental leave duration contributed to a divergent probability of re-entry corresponding to the educational attainment of mothers. The probability of re-entry into the labour market decreased for less-educated women and increased for better-educated woman until 2000. So, mothers with lower levels of educational attainment returned later, whereas better-educated mothers returned more quickly (polarisation hypothesis).

In the early 1990s, the payment duration period of childrearing benefits was detached from the maximum parental leave duration. Since then childrearing benefits were means tested which meant that women with low levels of education and thus lower income were particularly eligible to receive this payment. In addition, in 2001, the option to choose 12 instead of 24 months of benefit payment

duration was introduced which was intended to make shorter interruptions more attractive for less-educated women without influencing the choice of better-educated women. Thus, this reform can be expected to narrow the educational gap and reduce the influence of educational attainment on re-entry. In summary, the following hypothesis is derived: the German family policy with respect to childrearing benefits between 2001 and 2006 reduced the divergent probability of re-entry according to the educational attainment of mothers. The probability of re-entry into the labour market increased for less-educated mothers, meaning that they returned earlier, whereas better-educated mothers were not affected by this policy change (depolarisation hypothesis).

2.5 Data, variables and method

2.5.1 Data

The empirical analysis uses data from the ALWA study, a retrospective life course survey conducted in Germany, in 2007–2008, on behalf of the Institute for Employment Research (IAB) (Antoni et al. 2010, 2011). This survey is based on a representative sample of the resident population living in Germany. The longitudinal dataset provides information on approximately 10,000 respondents born between 1956 and 1988. It systematically collected retrospective information from major life domains, such as schooling, vocational training, employment, or unemployment. The dataset also contains retrospective information concerning partners, parental leaves, and children.

In this chapter, I focus on family related employment interruptions of West German women born and living in West Germany or the Federal Republic of Germany, excluding women born in the German Democratic Republic and interruptions taking place there. Owing to different conditions (e.g. leave regulations, unemployment rate, child care availability, female employment, family structure) and another cultural imprinting other mechanisms can be assumed to be at work in East Germany, the German Democratic Republic, and also in other countries (Blossfeld, Drobnič and Rohwer 2001). All interruptions of a woman are included in the analyses. Women who only took the statutory maternity leave of 14 weeks are included in the analyses to avoid a potential selection problem created by non-leave takers. Owing to the limited number of cases, family related employment interruptions of men are excluded. The analysis focuses on the period between 1979 and 2006, covering the most important changes of parental leave legislation except for the reform of 2007. This reform is not included in the analyses because of the short time span between the reform and the interview date.

Two samples are created: one (i) including women not employed 12 months before the birth of their first child (sample 1) and (ii) one excluding them because the job parental leave legislation does not apply to them (sample 2).[4] Under these restrictions, the dataset covers around 4,400 (3,600 in the restricted sample) spells of parental leave and contiguous periods of labour market inactivity and around 1,670 (1,500 in the restricted sample) re-entries. The original spell data were converted into a monthly person-period file.

2.5.2 Dependent and independent variables

The dependent variable denotes whether a woman has re-entered the labour market and works for more than 15 hours per week following a related employment interruption. The total duration of the interruption consists of the minimum statutory maternity and parental leave period and, if taken, the additional time spent as homemaker immediately after the parental leave period. Each spell of employment interruption ends either with a return to the labour market or is censored, for example, by a subsequent interruption due to childbirth. Observations are censored after five years of continued interruption to create a better comparability between the cohorts.[5]

The covariates contain individual and family characteristics (see Table 2.2). Educational attainment of the respondent is measured as time-varying covariate combining information concerning the highest school qualification and highest vocational training qualification obtained in the month of observation. The variable follows an adapted version of the CASMIN classification scheme and reflects the highly standardised and stratified educational system in Germany (Müller, Steinmann and Ell 1998). To assess the effect of different parental leave schemes, child birth cohorts combining the most relevant leave phases (see Table 2.1) were constructed following an approach by Gottschall and Bird (2003). Four aggregated cohorts were devised: the maternity leave cohort (*Mutterschaftsurlaub*: from July 1979–December 1985), the short parental leave cohort, which contains multiple parental leave extensions within a short period of time (*Erziehungsurlaub – kurz*: from January 1986–December 1991), the long parental leave cohort (*Erziehungsurlaub – lang*: January 1992–December 2000), and the reformed parental leave cohort (*Elternzeit*: January 2001–December 2006). In addition, a variable is included, which indicates the status of the interruption with respect to the job guarantee. It differentiates between interruptions within the job guarantee, within five months

4 Sample 2 covers around 80 per cent of all mothers excluding women in schooling or training (13.8 per cent), unemployed women (3.6 per cent), and homemakers (2 per cent).

5 Changing the threshold (e.g. to 15 years) yields to almost identical results.

of the expiration of the leave (i.e. in the exact month, two months before, or two months after) and outside the leave. The unrestricted sample also includes the information whether the regulations do not apply because women were not employed 12 months before the birth of their first child.

Table 2.2: Descriptive statistics

Variables	Mean (categorical variables in %)	Std. dev.
Parental leave stage (time-varying)		
Before expiration of parental leave	56.4 % (66.2 %)	
Around expiration of parental leave	11.4 % (13.4 %)	
After expiration of parental leave	17.4 % (20.4 %)	
Regulations do not apply	14.8 %	
Educational attainment (time-varying)		
No vocational degree OR no schooling degree and apprenticeship	20.2 % (19.2 %)	
Lower schooling degree and apprenticeship	25.1 % (27.1 %)	
Higher secondary schooling degree and apprenticeship OR higher vocational training degree	35.8 % (35.0 %)	
University degree or similar	18.9 % (18.7 %)	
Child birth cohort (time-constant)		
Maternity leave cohort (1979–1985)	8.2 % (7.4 %)	
Short parental leave cohort (1986–1991)	27.6 % (26.7 %)	
Long parental leave cohort (1992–2000)	48.3 % (49.5 %)	
Reformed parental leave cohort (2001–2006)	15.9 % (16.4 %)	
Married (time-varying)	90.1 % (91.8 %)	
Age of mother (in years) (time-varying)	30.6 (30.1)	4.7 (4.5)
Age of youngest child (in years) (time-varying)	1.6 (1.6)	3.0 (3.0)
Age of youngest child squared (time-varying)	11.9 (11.4)	56.6 (55.6)

Table 2.2 continued

Variables	Mean (categorical variables in %)	Std. dev.
Maximum number of children in household (time-varying)		
One child	40.7 % (42.2 %)	
Two children	41.2 % (41.2 %)	
Three or more children	18.1 % (16.7 %)	
Labour force experience before interruption (in years) (time-varying)	6.5 (6.9)	4.2 (4.1)
Unemployment experience before interruption (in years) (time-varying)	0.5 (0.4)	1.3 (1.0)
Regional type		
Urban/agglomeration	58.8 % (59.2 %)	
Rural	29.8 % (28.5 %)	
Not defined	11.4 % (12.3 %)	
Regional unemployment rate	9.0 (9.0)	1.4 (1.4)
Observations (person months)	115,179 (98,098)	

* Restricted sample (sample 2) in parentheses.

Several individual level control variables such as woman's age, marital status and employment characteristics are included in the analyses. Owing to data structure of the person-period file, most covariates can in principle vary over time or over subsequent interruptions of a mother. For example, accumulated labour market and unemployment experience are taken into consideration by counting up the months a woman was employed or unemployed before the observed point in time. Family characteristics, such as the age of the youngest child and the total number of minors in the household, are additionally used as controls. To account for macro level changes, the models contain the female unemployment rate on a regional level.

Unfortunately, the regional child care coverage is only available on a regional basis (e.g. administrative districts) from 1992 onwards. Between 1985 and 2002, only aggregated data for the different federal states measured at a time interval of four years exist. Child care coverage refers to the places available per 1,000

(under 3)/100 (3 until 6) children in the respective age group (child place relation) and is available on federal state level. It is available for the year 1982, 1986, 1990, 1994, 1998, and 2002. For the years without data the child care coverage was imputed assuming a linear development between the years of observation.[6] Instead, I include the degree of urbanisation at the place of residence as a proxy for child care coverage which is not available on a regional basis for the whole time under study. Empirically, it has been shown that child care coverage in Germany is higher in urbanised regions (Kreyenfeld and Hank 2000).

2.5.3 Method

The data are analysed using discrete-time event history analysis taking time-constant, individual-specific unobserved heterogeneity into account (Jenkins 1995; Singer and Willett 2003). This method considers the multiple-spell structure of the data with several possible re-entries per woman. A complementary log-log link function is used instead of the more commonly used logistic function. This link function is particularly suitable when the probability of an event within a single month is small, and when episodes stem from different time periods (Singer and Willett 2003). The coefficients reflect the conditional probability of event occurrence at time interval t_i, given that the event has not occurred until time interval t_{i-1}. I allow the transition rate to vary across time intervals, and estimate the PH model as a discrete-time approximation to the piecewise constant exponential model (PCE) often used for continuous time. The model is formulated as follows:

$$\log\left[-\log(1-\lambda(t))\right] = \alpha(t) + x_i'\beta + z_i'(t)\gamma + u,$$

$$\text{with } u: \log(v)$$

Where $\alpha(t)$ is the set of dummy variables reflecting time-dependency, $x_i'\beta$ is the set of time-constant covariates, $z_i'(t)\gamma$ is the set of time-varying covariates and u is the error term (Steele 2008, 2011). Time dependency is introduced by grouping periods in intervals ending after 14, 24, and 36 months and at the maximum observed period. This choice also reflects the potential leave durations of selected periods. For model selection Akaike's information criterion (AIC) is used, which leads to more parsimonious models because additional covariates are punished (see Kuha 2004).

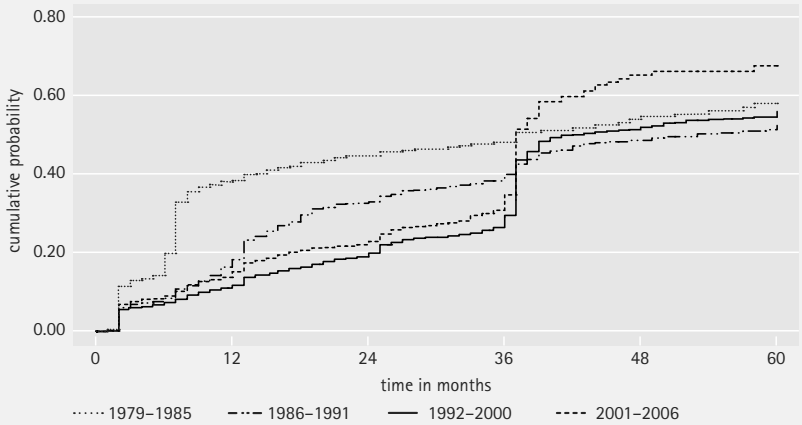
6 The years from 1982 until 1985 were excluded because according to the Federal Statistical Office the data quality is problematic for 1982. We thus follow the strategy of Frodermann (2011).

To examine changes over time, I estimate models for different child birth cohorts under the various family policy regimes. However, in regression models with a binary dependent variable, hazard ratios or, more precisely, their standard errors are likely to be biased when compared over different cohorts. The reason for this bias is the potentially different degree of unobserved heterogeneity in cohorts arising, for example, from different economic situations or different cohort sizes. Therefore, I additionally present the significance levels of Average Marginal Effects (AMEs). A major advantage of AMEs is their robustness with respect to the aforementioned problem (Auspurg and Hinz 2011; Mood 2009). AMEs can be seen to indicate the change in predicted probabilities for an event to occur (here re-employment) if the independent variable increases by one unit. For the categorical variable educational attainment, the marginal effects indicate the change in the predicted probabilities relative to the reference category.

2.6 Employment re-entry after family related employment interruptions – descriptive and multivariate results

Figure 2.1 shows Kaplan-Meier failure functions distinguishing the different child birth cohorts. For the maternity leave cohort (1979–1985) and the short parental leave cohort (1986–1991), the return probabilities within the first three years of interruption are higher than the probabilities for later birth cohorts. In addition, a large difference between the two earliest cohorts is visible that can be attributed to different parental leave schemes. More women in the maternity leave cohort (1979–1985) re-enter employment before the end of their parental leave of 6 months than in the short parental leave cohort (1986–1991) before their longer leave of at least 12 months. The return probabilities for mothers who gave birth to a child between 1992 and 2006 are low within the potential parental leave duration period. However, a sharp increase occurs when the potential parental leave expires. Additionally, this pattern is apparent after approximately six months for the maternity leave cohort (1979–1985). These findings are in line with the horizon hypothesis. The pattern is not visible for the short parental leave cohort (1986–1991) probably because the potential leave duration changed repeatedly. After around three years, the different birth cohorts except for the youngest cohort show a similar pattern. The highest return rate at the end of the observation period is exhibited by the reformed parental leave cohort (2001–2006), probably reflecting a general time trend of women returning earlier. However, an increase return rate at the end of 12 months is not visible, indicating that only few women chose the shorter duration of parental benefits associated with higher payments.

Figure 2.1: Kaplan-Meier failure curve of employment interruptions, by child birth cohort[7]



Source: ALWA, authors' own calculations.

Next, a multivariate setting is chosen to test the hypotheses. The conditional probabilities displayed are interpreted in terms of re-entry probability. Table 2.3 presents hazards ratios of the clog-log models for the unrestricted and restricted samples. The estimated correlation *rho* suggests significant dependence among the employment interruptions of the same mother additionally indicating the appropriateness of the chosen statistical model.

Table 2.3: Discrete-time event history models on the likelihood to re-enter the labour market

	Unrestricted Model 1 (Sample 1)	Restricted Model 2 (Sample 2)
Parental leave stage (ref. around expiration of parental leave)		
Before expiration of parental leave	0.164*** (0.013)	0.155*** (0.013)
After expiration of parental leave	0.514*** (0.059)	0.530*** (0.064)
Regulations do not apply	0.210*** (0.035)	
Educational attainment (ref. university degree or similar)		
No vocational degree OR no schooling degree and apprenticeship (cat. 1)	0.361*** (0.062)	0.323*** (0.062)
Lower schooling degree and apprenticeship (cat. 2)	0.680* (0.103)	0.605** (0.097)
Higher secondary schooling degree and apprenticeship OR higher vocational training degree (cat. 3)	0.663** (0.091)	0.610** (0.092)

7 Additional figures are available upon request.

Table 2.3 continued

	Unrestricted Model 1 (Sample 1)	Restricted Model 2 (Sample 2)
Child birth cohort (ref. maternity leave cohort (1979–1985))		
Short parental leave cohort (1986–1991)	0.570***	0.595***
	(0.078)	(0.090)
Long parental leave cohort (1992–2000)	0.570***	0.648*
	(0.092)	(0.119)
Reformed parental leave cohort (2001–2006)	0.671*	0.809
	(0.133)	(0.180)
Married	0.403***	0.417***
	(0.049)	(0.056)
Age of mother (in years)	1.054***	1.051**
	(0.014)	(0.016)
Age of youngest child (in years)	0.533***	0.459***
	(0.047)	(0.047)
Age of youngest child squared	1.034***	1.041***
	(0.005)	(0.006)
Maximum number of children in household (ref. one child)		
Two children	0.691***	0.666***
	(0.052)	(0.053)
Three or more children	0.474***	0.453***
	(0.068)	(0.071)
Labour force experience (in years)	1.013	1.009
	(0.008)	(0.009)
Unemployment experience (in years)	0.727***	0.690***
	(0.042)	(0.052)
Regional type (ref. urban/agglomeration)		
Rural	0.899	0.907
	(0.099)	(0.110)
Not defined	1.113	1.170
	(0.171)	(0.190)
Regional unemployment rate	1.036	1.036
	(0.023)	(0.025)
Duration		
1 to 14 months	0.036***	0.040***
	(0.016)	(0.020)
14 to 24 months	0.046***	0.059***
	(0.021)	(0.030)
24 to 35 months	0.154***	0.212**
	(0.074)	(0.115)
More than 36 months	0.313*	0.500
	(0.168)	(0.304)
Rho	0.667***	0.676***
	(0.017)	(0.018)
Observations (person months)	115,179	98,098
Number of events	1,672	1,501
AIC	15,925.6	14,091.7

Hazard ratios (exponentiated coefficients); standard errors in parentheses; the results are obtained by maximum likelihood estimation (using xtclogclog in Stata 11).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results of the model in Table 2.3 including all child birth cohorts simultaneously indicate that the re-entry probability is significantly lower before and after the legal parental leave period expires than around the expiration of the parental leave period. Clearly, the expiration of the leave period pushes mothers back into the labour market. In the unrestricted model, the non-eligibility also decreases re-entry probability meaning that, for example, women who were not employed before birth return slower compared with eligible mothers whose leave expires. Institutional regulation changes of leave duration play a crucial role in shaping re-entry patterns, a conclusion that supports the horizon hypothesis. Mothers postpone re-entry and get active on the labour market again around the expiration of their parental leave. Women with lower levels of educational attainment re-enter more slowly than women with a university degree or similar. The opportunity costs of staying at home for women with lower levels of educational attainment are higher than their potential market wage as child care will have to be externalised. These conclusions support the education hypothesis. Furthermore, significant cohort differences are found. Compared with the maternity leave cohort (1979–1985) cohort, all cohorts exhibit a lower return probability. However, this is not the case for the restricted sample. In the restricted sample, the effect for the reformed parental leave cohort (2001–2006) disappears indicating a potential selection of women into employment and thus eligibility to parental leave schemes for the parental leave cohort. One possible explanation is that less-educated mothers encounter increasing difficulties in the labour market, making them less often eligible for parental leave. This can bias the cohort effect for the restricted sample.

The results for the control variables indicate that family circumstances play a crucial role in shaping labour market re-entry of mothers. Being married decreases the re-entry probability significantly. In addition, older women are more likely to return. The effect of children's age is u-shaped. For mothers, it becomes first less likely to return until their youngest child is around 9 years old, and then more likely, which seems plausible because caring becomes less time intensive, as children grow older.[8] Additionally, the number of children under 18 years decreases the return probability. On the contrary, labour force experience has no significant effect on women's return. However, the cumulated unemployment experience decreases their return probability. From the macro level variables, neither the unemployment rate nor the degree of urbanization significantly influences re-entry. In summary, the results are largely in line with previous research results.

8 The turning point of the parabola is at –ln(0.5329)/2*ln(1.0335)=9.54 years.

Table 2.4: Discrete-time event history models on the likelihood to re-enter the labour market including child care coverage, child birth cohorts 1986–2002

	Model 2 with child care coverage under 3 years	Model 3 with child care coverage 3 until 6 years
Parental leave stage (ref. around expiration of parental leave)		
Before expiration of parental leave	0.156***	0.156***
	(0.015)	(0.015)
After expiration of parental leave	0.548***	0.546***
	(0.068)	(0.068)
Regulations do not apply	0.216***	0.220***
	(0.040)	(0.041)
Educational attainment (ref. university degree or similar)		
No vocational degree/no schooling degree and apprenticeship	0.363***	0.362***
	(0.071)	(0.0704)
Lower schooling degree and apprenticeship	0.692*	0.691*
	(0.118)	(0.118)
Higher secondary schooling degree and apprenticeship/ higher vocational training degree	0.722*	0.728*
	(0.113)	(0.114)
Child birth cohort (ref. 1986–1991)		
1992–2000	0.984	1.069
	(0.112)	(0.131)
2001–2006	0.700	0.797
	(0.171)	(0.203)
Married	0.350***	0.346***
	(0.049)	(0.048)
Age (in years)	1.064***	1.070***
	(0.017)	(0.017)
Age of youngest child (in years)	0.540***	0.541***
	(0.055)	(0.055)
Age of youngest child squared	1.033***	1.033***
	(0.006)	(0.005)
Maximum number of children in household (ref. one child)		
Two children	0.673***	0.673***
	(0.058)	(0.058)
Three or more children	0.420***	0.420***
	(0.067)	(0.068)
Labour force experience (in years)	1.012	1.012
	(0.010)	(0.010)
Unemployment experience (in years)	0.732***	0.729***
	(0.047)	(0.046)
Regional unemployment rate	1.018	1.012
	(0.034)	(0.034)
Child care coverage	1.002#	1.012
	(0.001)	(0.034)
Rho	0.671***	0.667***
	(0.021)	(0.021)
Observations (person months)	93,096	93,096
Number of events	1,193	1,193
AIC	12099.0	12099.8

Hazard ratios (exponentiated coefficients); standard errors in parentheses, time-dependency not displayed.
# $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.4 includes the regional child care coverage in the analyses but is restricted to the time period between 1986 until 2002. Child care coverage for children under three (Model 3 Table 2.4) has a marginal influence on re-entry which is also significant at the 0.10 level. Child care coverage for children in kindergarten age (Model 4 Table 2.4) does not have a significant influence. This is in line with research using administrative data (Frodermann 2011). The cohort effect must be interpreted carefully because now the reference category is the period 1986–1991. The results with respect to the other variables remain basically the same. Thus, I am confident that including the degree of urbanization as a proxy for child care coverage is adequate.

To test the (de-)polarisation hypotheses, I examine more parsimonious separate models for different child birth cohorts with the unrestricted sample 1 additionally leaving out the macro level controls and unemployment experience.[9] Each of the child birth cohorts represents a cohort for which similar family policy regulations were in effect (see Table 2.1). As presented in Table 2.5, the hazard ratios are not comparable (see Mood 2009). Therefore, I test whether there are significant differences with respect to educational attainment within each child birth cohort, and additionally present significance levels of the estimated average marginal effects. In the earliest child birth cohorts from 1979 to 1985 (Model 5), I find no significant differences between the different educational groups and the reference group. Significant effects of educational attainment are identified in the short parental leave cohort (1986–1991) (Model 6) for women who are holding an apprenticeship. However, significant differences for all women compared with women holding a university degree or similar are found in the two post-1991 child birth cohorts (Models 7 and 8). I find considerable evidence that educational attainment mattered more in later than in earlier child birth cohorts and thus some support for the polarization hypothesis. Contrary to my expectations, there is no indication of a depolarization for the reformed parental leave cohort (2001–2006). Instead, it appears that educational polarization continues, despite the changes in institutional regulations. The results must be interpreted carefully because here, only some interruptions could be observed for the whole observation period of 60 months, while other interruptions were censored. On the whole, there is no indication for an educational depolarisation but again for a polarization trend for the two younger cohorts. This is supported by Wald tests, which test for the incremental model contribution of educational attainment. The results indicate that educational attainment becomes relevant on a lower significance level in the maternity leave cohort (1986–1991) and highly significant from 1992 onwards.[10]

9 The control variables are not interpreted because I do not assume cohort differences for them.

10 Alternative specifications and tests confirm the robustness of the results with regard to the (de-)polarization hypotheses. Results are available upon request.

Table 2.5: Discrete-time event history models for different child birth cohorts on the likelihood to re-enter the labour market

Child birth cohorts	Model 5 Maternity leave (1979–1985)	Model 6 Short parental leave (1986–1991)	Model 7 Long parental leave (1992–2000)	Model 8 Reformed parental leave (2001–2006)
Parental leave stage (ref. around expiration of parental leave)				
Before expiration of parental leave	1.586* (0.329)	0.316*** (0.044)	0.131*** (0.016)	0.131*** (0.027)
After expiration of parental leave	1.453 (0.529)	0.704* (0.121)	0.425* (0.174)	0.110*** (0.069)
Regulations do not apply	0.975 (0.201)	0.432*** (0.077)	0.163*** (0.029)	0.072*** (0.026)
Educational attainment (ref. university degree or similar)				
No vocational degree OR no schooling degree and apprenticeship (cat. 1)	0.657 (0.192)	0.546**(**) (0.101)	0.528***(***) (0.081)	0.398***(***) (0.105)
Lower schooling degree and apprenticeship (cat. 2)	1.024 (0.284)	0.951 (0.160)	0.685**(**) (0.088)	0.650*(**) (0.123)
Higher secondary schooling degree and apprenticeship OR higher vocational training degree (cat. 3)	0.893 (0.240)	0.906 (0.140)	0.769*(*) (0.086)	0.585***(**) (0.090)
Married	0.570** (0.114)	0.549*** (0.072)	0.564*** (0.068)	0.564** (0.112)
Age of mother (in years)	1.001 (0.034)	1.013 (0.019)	1.021 (0.013)	0.997 (0.018)
Age of youngest child (in years)	0.706 (0.144)	0.717 (0.128)	0.577** (0.121)	0.472 (0.222)
Age of youngest child squared	1.016 (0.011)	1.022* (0.010)	1.031** (0.011)	1.041 (0.026)
Maximum number of children in household (ref. one child)				
Two children	0.753 (0.134)	0.611*** (0.063)	0.760*** (0.060)	0.768* (0.099)
Three or more children	0.881 (0.357)	0.342*** (0.083)	0.433*** (0.063)	0.533* (0.143)
Labour force experience (in years)	1.073*** (0.020)	1.044*** (0.013)	1.032** (0.012)	1.028 (0.018)
Observations (person months)	9,450	31,761	55,697	18,301
Number of events	218	476	695	284
AIC	1,924.0	4,714.1	6,990.3	2,745.6
Wald-test: incremental contribution of educational attainment (p-value)	0.1545	0.0015	0.0000	0.0002

Time-dependency not displayed; hazard ratios (exponentiated coefficients); standard errors in parentheses; AMEs significance levels of educational attainment in parentheses; standard errors of AMEs are calculated using the delta method (using margins in Stata 11).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

2.7 Discussion and conclusions

The aim of this chapter was to provide insights on educational differences and how they have affected employment re-entry patterns for women in West Germany during the past three decades. Striking evidence for the relevance of parental leave schemes for re-entries was found especially for the duration of the job-guarantee, whereas the duration of payments seemed less important. As women tend to make use of the entire leave period, regardless of its legal duration, the gradual extension of parental leave duration has led to longer interruptions. Even if longer periods of leave do not affect the probability of employment re-entry, they can still have negative consequences in the long run and destabilise the careers of mothers (Aisenbrey, Evertsson and Grunow 2009).

Furthermore, there is some indication that women with different levels of educational attainment have different re-entry patterns. Women who hold a university degree are more likely to re-enter the labour market than any other group of women. A woman who has spent a substantial period in the educational system has presumably already decided that she intends to make use of her investment and consequently returns earlier. Finally, I found some evidence of an educational polarization of re-entry behaviour between less-educated and better-educated women during the years. Especially for interruptions of women with children born from 1992 onwards, the educational divides became visible. However, a narrowing of the educational gap which was theoretically assumed for the period after 2001 was not found. This can be attributed to the finding that only few women actively chose to take only 12 months of leave. In sum, the leave duration that is related to the job guarantee seems far more important than the financial compensation of the leave. Additional robustness tests were used to ensure that my results do not merely reflect the general time trend, which is, admittedly, also present in the results. However, disentangling the pure and causal effects of the reforms was not the aim of this chapter.

Empirically it is difficult to fully disentangle the effects of institutional and structural influence factors. Given the data it is at least possible to analyse the joint effects of these changes. Thus, the overall impact of institutional and societal changes on the duration of family related career interruptions and labour market re-entry patterns can be studied. Also, the effects of institutional and structural influences are difficult to grasp. Given the unavailability of macro data on for example unemployment rate or child care availability for such a long time span I can only be aware of the possibility that they disturb my results. However, I do not neglect those changes but discuss them again in relation to our empirical results.

In summary, the family policy reforms in West Germany may contribute to increasing inequalities of labour market opportunities for women with different levels of education. For example, owing to periods of labour market inactivity, pension claims are diminished, which could in the long run lead to poverty in old age. This is especially true for mothers with lower levels of education (Strauß and Ebert 2010). Although the effect is less clear, family related employment interruptions might also lead to short- and long-term wage penalties (Beblo, Bender and Wolf 2009; Ziefle 2004).

The presented research also has some political implications. The results can be projected onto the latest parenting benefit reform, which came into effect in Germany in 2007. This reform replaced maternity/paternity benefit payments with an earnings-replacement benefit. It was expected that the changes made to family policy in 2007 would lead to a 'move towards the Nordic model' (Spiess and Wrohlich 2008). However, the results suggest that the reforms could, in fact, further reinforce educational inequality, as current regulations particularly support the rapid return of highly skilled mothers to the labour market. But given the fact that Germany will encounter a labour shortage in the near future, the focus should be on family and labour market policies that enable all mothers to combine work and family, regardless of their level of educational attainment.

3 Between familial imprinting and institutional regulation: Family related employment interruptions of women in East and West Germany and the GDR[11]

Abstract

In this chapter, I examine how family related employment interruptions for women in the FRG (Federal Republic of Germany) and the GDR (German Democratic Republic) developed in the period prior to German reunification. Furthermore, I investigate how career interruptions developed after the German reunification in the old and new states and whether a convergence of re-entry behaviour can be observed. Following research questions are addressed: Which factors are more important: attitudes towards the employment of mothers, which were transferred through socialisation in childhood and adolescence, or institutional arrangements shaped by parental leave regulations? Based on data from the IAB-ALWA study ('Working and Learning in a Changing World'), the results show that even twenty years after the German reunification, significant differences between women in East and West Germany are found to exist with respect to family related employment interruptions. These interruptions are subject to strong institutional control. Women who were raised in the GDR and moved to one of the old federal states after the reunification do not behave differently than West German women. This result suggests that institutional arrangements including for example child care availability are more important for re-entry behaviour than socialisation. However, the results must be interpreted carefully: it could be that the willingness to move of East German women is also influenced by socialisation.

JEL classification: J21, C41

Keywords: maternal employment, parental leave legislation, discrete-time event history analysis

11 This chapter is authorized by the original copyright holder VS Verlag für Sozialwissenschaften | Springer Fachmedien Wiesbaden GmbH and is the English version of: Drasch, Katrin. 2011. Zwischen familiärer Prägung und institutioneller Steuerung. Familienbedingte Erwerbsunterbrechungen von Frauen in Ost- und Westdeutschland und der DDR. In Reproduktion von Ungleichheit durch Arbeit und Familie, Eds. Peter A. Berger, Karsten Hank and Angelika Tölke, 171–200. Wiesbaden: VS Verlag für Sozialwissenschaften. doi: 10.1007/978-3-531-94117-2_8. With kind permission from VS Verlag für Sozialwissenschaften | Springer Fachmedien Wiesbaden GmbH. The English version is also available as: Drasch, Katrin. 2012. Between Familial Imprinting and Institutional Regulation: Family Related Employment Interruptions of Women in Germany Before and After the German Reunification. IAB Discussion Paper 09. Nuremberg: Institute for Employment Research. All remaining errors are mine.

3.1 Introduction

The German reunification in 1990 united two states that had existed separately since 1949 but share a long common history. Within a few months, the reunification dramatically changed the lives of more than 18 million East German citizens and had a large influence on the West German population. Both populations consequently experienced a number of disturbances and structural adaptations in different areas of life. Two areas in which there were especially large differences between the FRG (Federal Republic of Germany) and the GDR (German Democratic Republic) were the employment behaviour of women with children and the opinion of the population towards the employment of females. Therefore, after the German reunification, major changes in female employment patterns were expected especially for women from the GDR.

In particular, the interaction between family and working lives for GDR citizens has changed significantly through the reunification process. The socialist regime in the GDR supported the gainful employment of mothers directly by means of an extensive nationwide child care system and indirectly through limited legal options for employment interruptions following the birth of a child. In contrast, in the FRG, it was common for women to assume caring obligations of their children at home for several years, especially when their children were babies or toddlers. Subsequently, those women often returned to the labour market to seek part-time work. This pattern is known as the modified male breadwinner model. This model was additionally supported by a rather generous parental leave system. Only in recent years has the pattern begun to gradually change (Bothfeld et al. 2006a).

In contrast, children and young people in the former GDR were raised in a social system in which women and men were expected to participate in the labour market equally, regardless of whether they had to raise children. Thus, children in the GDR were often socialised in their families in a manner that was completely different than that of children and adolescents in the FRG, who were often raised by non-working mothers. This difference may explain why the empirically observed differences in the labour force participation rates of women or mothers in the old and new federal states are more pronounced even today (see 3.3). Growing up in different 'life course regimes' (Diewald 2010) could lead to persisting inequalities with respect to the labour force participation rate of mothers or even women in general. The socialisation processes in childhood and adolescence could have led to the development of inequalities in one of these processes, namely, family related career interruptions in East and West Germany.

In particular, it is unclear how long women in the GDR, the FRG and today's West and East Germany interrupted their employment after the birth of a child

and what factors crucially influenced the length of such interruptions. Likewise, it is uncertain how the transition of the political system of the GDR influenced such employment interruptions. Essentially, identical parental leave arrangements could have led to different results depending on the cultural conditions in which they were embedded (Hummelsheim 2009). In summary, the German reunification and the influence of social norms for women's employment and institutional arrangements for parental leave provisions is an interesting research field. This chapter addresses the following research questions: how were employment interruptions for women in the FRG and GDR shaped before the German reunification? How did employment interruptions change for women after the German reunification when the different institutional arrangements are considered? Which factors are more important: attitudes towards the employment of mothers, which were transferred through socialisation in childhood and adolescence, or institutional arrangements shaped by parental leave regulations?

The first step in answering these questions involves an explanation of the institutional conditions in the FRG, the GDR and reunified Germany in the second section. Additionally, the different attitudes in both parts of the unified Germany are outlined. In the third section, previous research on family related employment interruptions and the employment of women with children is presented. The fourth section describes general differences between the East and West Germany populations with respect to attitudes towards the employment of women with children. The theoretical perspective, which considers approaches on both the institutional and individual levels, is explained in the fifth section. In the subsequent sections, the data are presented and the research questions are examined with new life course data from the IAB study ALWA. Finally, the results are summarised and discussed.

3.2 Institutional regulations in Germany and the GDR

3.2.1 Institutional regulations in the FRG and GDR before the German reunification

A number of institutional conditions in Germany and the GDR prior to the German reunification can be identified as affecting family related employment interruptions. First, the direct influence of the maximum duration of statutory parental leave periods is described. This leave period is connected to a guaranteed right to return to a pre-employment interruption employer. In addition, the state financial compensation for the foregone earnings of families who assume care obligations can affect family related employment interruptions indirectly (Bird 2004).

In Germany, *maternity leave (Mutterschutz)*[12] was introduced in 1952. *Maternity leave* exempts employed women from work six weeks prior to the expected birth of a child and eight weeks (until 1968 6 weeks) following birth and protects a women from being dismissed by her employer for four months following the birth of her child. *Maternal leave (Mutterschaftsurlaub)* was introduced in West Germany in 1979. In the following decades, *parental leave* regulations changed frequently. Following the statutory period of *maternity leave (Mutterschutz)* of 14 weeks, which is granted to every woman regardless of her employment status prior to the birth of a child, the temporary exemption from work was extended to four months. *Parental leave (Erziehungsurlaub)* was extended to 10 months in 1986, to 12 months in 1988, to 15 months in 1988 and to 18 months in 1990 (Bird 2004; Kreyenfeld 2001; Puhani and Sonderhof 2011; Schönberg and Ludsteck 2007).

In the GDR, the situation was completely different. Although a *maternal leave* scheme had existed since the 1950s, the *Schwangerschafts- und Wochenurlaub* (pregnancy and puerperium holiday), which provided for 26 weeks of leave with payment of the net average earnings before birth, was not introduced until 1976 (Winkler 1989). In addition, since 1972, single mothers have been permitted to take a *baby year* if no institutional child care could be made available by the state. Although this *baby year* was introduced for mothers with two or more children in the late 1970s and prolonged to 18 months for mothers with three children or more in 1984, this period was only established by law in 1986 for all mothers regardless of the number of children they have (Kreyenfeld 2001).

These rules must be considered in conjunction with the prevalent social policy in the GDR. Within this framework, gender equality policies had already been established in the constitution as a central goal in the early years of the GDR. These policies included the development of a public child care system for children less than three years of age and efforts to train women in the same manner as men are trained for the labour market (Marold 2009; Winkler 1989). However, women were also responsible for household duties; therefore, the traditional roles of men and women persisted, and women were confronted with the double burden of employment and family responsibilities (Kreyenfeld 2001; Rosenfeld, Trappe and Gornick 2004).

3.2.2 Institutional regulations in Germany after the reunification in 1990

Based on the Unification Treaty, the legal regulations of the FRG were enacted for the citizens of the GDR. The first and most recent expansion of parental leave

12 The notations in *italics* correspond to the official names in German law terminology which are added in parentheses.

in the unified Germany occurred in 1992 and increased the parental leave period from 18 to 36 months. However, the payment of *parental allowance* in the form of income-dependent transfer payments to compensate for a loss of income became increasingly important. In 1993, the payment period was increased to 24 months. In 2001, *parental leave* was reformed and the *Elternzeit* system *(reformed parental leave)* was introduced, but 36-month protection of the employment relationship after birth was retained. The next major reform in 2001 allowed parents to work 30 hours rather than 19 hours per week during *parental leave*.

The introduction of the new *parental benefits* system on 1 January 2007 was the most severe change in the law since its introduction. This new *parental allowance* system changed the calculation of financial compensation but did not alter the maximum parental leave period and the right to return to one's previous employer. *Parental benefits* have been calculated based on earnings since 2007. This regulation is expected to encourage new parents, especially higher-income parents, to shorten their interruption periods because the allowance is paid for only 12 to 14 months, depending on whether a father also takes parental leave. An upper limit is established only for high earners with a net income of 2,700 € or greater.

The frequent changes in the institutional arrangements of parental leave schemes and, in particular, the extension of the right to return to one's previous employer must be considered in the context of the conservatively oriented political coalition of the late 1980s. This coalition supported a traditional role model, which considered women to be second earners. Moreover, the poor labour market conditions in Germany in the 1980s and the beginning of the 1990s may have influenced these policies. In addition, regulations, such as family load balancing (*Familienlastenausgleich*), and other social conditions supported the non-employment of (married) women with children. For example, the joint taxation of married couples leads to significant tax advantages if one partner does not have (full-time) employment (Dingeldey 2002). Moreover, in West Germany, the child care system for children under three is still only poorly developed, although there have been some efforts to improve the situation in the past. For children in compulsory school, care is institutionally secured only in the morning, although some schools have also begun to offer all-day schools. The child care supply quotas are historically much higher in East Germany than in West Germany (Hank, Kreyenfeld and Spiess 2004). Table 3.1 gives an overview of regulations in the FRG, the GDR and unified Germany.

Table 3.1: Parental leave legislation in the GDR, the FRG and Germany (selection), 1952–2007

Date	Name of leave (English translation in parenthesis)	Duration of statutory parental leave with job guarantee (in months)	Duration of (means-tested) maternity/paternity benefit (in months)
1952	Mutterschutz (Maternity leave)	2 (14 weeks)	2 (14 weeks)
1976	*Schwangerschafts- und Wochenurlaub (Maternity leave)**	*6 (26 weeks)*	*6 (26 weeks)*
1976	*Babyjahr für Mütter mit drei oder mehr Kindern (Baby year for mothers with three or more children)**	*12*	*12*
1984	*Babyjahr für Mütter mit zwei oder mehr Kindern (Baby year for mothers with two or more children)**	*18*	*18*
7/1979–12/1985	Mutterschaftsurlaub (Maternal leave)	6	6
1/1986–12/1990	*Babyjahr (Baby year) **	*12*	*12*
1/1986–12/1991	Erziehungsurlaub – kurz (short parental leave)	12–18	12–18
1/1992–12/2000	Erziehungsurlaub – lang (long parental leave)	36	24/36, depending on the federal state**
1/2001–12/2007	Elternzeit (Reformed parental leave)	36	12/24 (choice)
1/2007–present	Elterngeld (Parental benefits)	36	12, earnings related

Source: Bird (2004: pp. 311); Gottschall and Bird (2003); Kreyenfeld (2001: pp. 18, pp. 49); Obertreis (1986: pp. 287); Trappe (1995: pp. 39); Winkler (1989); own illustration.

* Regulation in the GDR.

** The third year was paid in Baden-Wuerttemberg, Bavaria, Mecklenburg-Western Pomerania, Rhineland-Westphalia and Thuringia by the state governments.

3.2.3 Fathers and parental leave regulations

Only few men assumed the role of caregivers for their own babies and toddlers both before and after the German reunification. In principle, the *baby year* in the GDR had also been accessible to men since 1986 (Winkler 1989). In addition, beginning in 1986 in West Germany, fathers were allowed to take *parental leave* to fulfill the role of the primary caregiver. However, only one parent was able to take *parental leave* at a time. Therefore, the use of *parental leave* by men was negligible by the end of the 1980s. Only 1.5 per cent of fathers took parental leave (Vaskovics and Rost 1999). Beginning in 2001, both parents could take *parental leave* at the same time, divide the leave into several periods or be simultaneously employed for a maximum of 30 hours (Bird 2004). Thus, this regulation would also allow for equal sharing of the leave between a man and a woman, but in reality, this benefit remained largely unused. Only approximately 5 per cent of fathers took *parental leave* (BMFSFJ 2004). However, the introduction of the new parental leave

allowance in 2007 increased the appeal of the use of *parental leave* by men, as the period for parental benefits could be extended to a total of 14 months because sharing leave leads to an additional two months of *parental leave*. Actually, this allowance has led to a rapid increase in the use of *parental leave*, but most fathers take only the two additional months that would otherwise expire (BMFSFJ 2009).

3.3 Employment and employment interruptions of women in Germany and the GDR

Before the German reunification, the labour force participation rates of women in the GDR were nearly as high as those of men; the similarity in these rates corresponded to the political principles of gender equality in the GDR. In 1988, the percentage of working women was more than 90 per cent (Frerich and Frey 1996: p. 78). Meanwhile, in West Germany, only approximately 60 per cent of women were gainfully employed (Bothfeld et al. 2006a). After the reunification, the shares converged: in West Germany, the proportion of employed women increased to 62 per cent in 1999, whereas in East Germany, the proportion of employed women decreased significantly to 72 per cent. One reason for this development was the economically difficult situation in the labour market in the newly formed federal states. Thus, women in East Germany are often regarded as the losers of the reunification process both in terms of their labour force participation and with respect to the difficulties that they encountered when re-entering the labour market (Rosenfeld, Trappe and Gornick 2004; Trappe 2006). Moreover, full-time employment rates decreased over time in both East and West Germany (Kreyenfeld and Geisler 2006). Although part-time work was of great importance in West Germany in the beginning of the 1990s, as 30 per cent of employed women worked part time, such work played only a minor role in East Germany: only 18 per cent of East German women worked part time during this period (Matysiak and Steinmetz 2008). However, Bonin and Euwals (2005) found that employment behaviour in East and West Germany converged gradually.

A similar trend can be shown for the labour force participation of mothers. During the 1990s, fewer women with children in East Germany had paid employment compared with those in the GDR before 1990. In the East, this rate continued to decrease from 70 per cent in 1996 to 65 per cent in 2002. Meanwhile, the employment rate for women with children increased dramatically. In West Germany, this rate increased from 48 per cent in 1996 to 56 per cent in 2002. However, almost 15 per cent in the West were marginally employed. For mothers with small children, the employment rate in East Germany was twice as high as that in West Germany and amounted to approximately 30 per cent (Kreyenfeld and Geisler 2006). It is

likely that more mothers registered themselves as unemployed in East Germany than in the West of the republic. Participation rates were also higher for better-educated mothers than for those with lower educational levels. In particular, the participation rates of women with low levels of education in the East have become aligned with the participation rates of mothers with low levels of education in West Germany over time. For better-educated mothers, this alignment did not occur. In sum, participation rates for mothers remain significantly higher in East Germany than in West Germany (Hanel and Riphan 2012). In 2010, 59 per cent of mothers in the old and 63 per cent in the new federal states were employed (Keller and Haustein 2012).

From a longitudinal perspective, family related employment interruptions in terms of East-West differences have rarely been studied. However, several studies that focus solely on West Germany are available (e.g. Aisenbrey, Evertsson and Grunow 2009; Grunow, Hofmeister and Buchholz 2006; Weber 2004). East-West differences are the focus of the studies that were conducted by Falk and Schaeper (2001; Schaeper and Falk 2003). These authors found distinct differences between East and West German mothers: East German mothers tend to have significantly shorter family related employment interruptions than West German mothers. The authors also identify differences in employment interruptions that occurred before and after the German reunification. Before the fall of the Berlin Wall, the majority of women ended their employment interruptions at the end of the *baby year* (i.e., after approximately one year). After the reunification, interruptions were significantly longer. Return rates were particularly high at the end of the statutory parental leave period. However, the database that was used for the analyses was not representative and was based on a selective group of apprentices from various graduating classes in East and West Germany. In addition, the number of cases under study is rather low. Another study by Bredtmann, Kluve and Schaffner (2009) studied East-West differences of women belonging to birth cohorts from 1939 to 1945. They examined women who were returning to work using complete pension biography data and found significantly higher return rates for women in East Germany than for women in West Germany: within the first ten years after the birth of a first child, only 45 per cent of women in the West had returned to employment, whereas in the East, this number amounted to 87 per cent. The return rate for women in the West decreased for each additional child born, whereas in the East, this rate remained relatively constant across all subsequent births. Women in the East often returned to work within the first 18 months of a child's life, whereas women in the West typically returned to work only after her (youngest) child began to attend kindergarten or school. However, these results were obtained for a period in which there were virtually no statutory regulations with regard to leave schemes in East and West Germany.

3.4 Attitudes towards the employment of mothers in East and West Germany

In West Germany, the general attitude towards working women is less traditionally oriented than it was two decades ago. In 1991, only 9 per cent of the West German respondents of the GGSS (German General Social Survey; Wasmer, Scholz and Haarmann 2008) completely agreed with the following statement 'A working mother can establish just as loving and secure a relationship with her children as a mother who doesn't work'. In 2008, the consent rate had already increased to 22 per cent. In East Germany, the attitude towards this statement has changed little (18 per cent in 1991 compared with 19 per cent in 2008). In West Germany, agreement with the following statement changed dramatically (5 per cent in 1991 versus 29 per cent in 2008): 'A child actually benefits if his or her mother has a job rather than simply concentrating on the home'. Agreement with this statement was already higher in 1991 (12 per cent), and the approval rate in 2008 was similar in the East and West; approximately a quarter of the population fully agreed with the statement.

A reverse trend is observed for the following statements: 'A small child is bound to suffer if his or her mother goes out to work' and 'It is much better for everyone concerned if the man goes out to work and the woman stays at home and looks after the house and children'. No decreasing trend in the rate of approval for these statements can be found for the old federal states in contrast with the former GDR states. In 1991, 12 or 10 per cent of the West German respondents and 28 or 26 per cent of the East German respondents fully approved of these statements. In 2008, 14 and 15 per cent of those in the West and 7 per cent or 8 per cent of those in the East agreed with these statements.

Despite the attitude changes in the old federal states, differences between East and West Germany remain: on average, compared with the population in West Germany, the population in East Germany was and continues to be more affirmative towards the employment of women. Figure 3.1 illustrates this affirmativeness based on the average values of the attitude statements presented above.

These results confirm those of Falk and Schaeper (2001) also for the period after 1996. Also Kreyenfeld and Geisler (2006) noted that the attitudes concerning maternal employment in East and West Germany did not converge. This lack of agreement contrasts with the trend of alignment in the employment rates of women. The results of other studies have been less clear (Besenthal and Lang 2004; Hummelsheim 2009; Marold 2009). Additionally, Matysiak and Steinmetz (2008) concluded that women in post-socialist societies adjust their behaviour only as a result of evolving structural conditions but actually

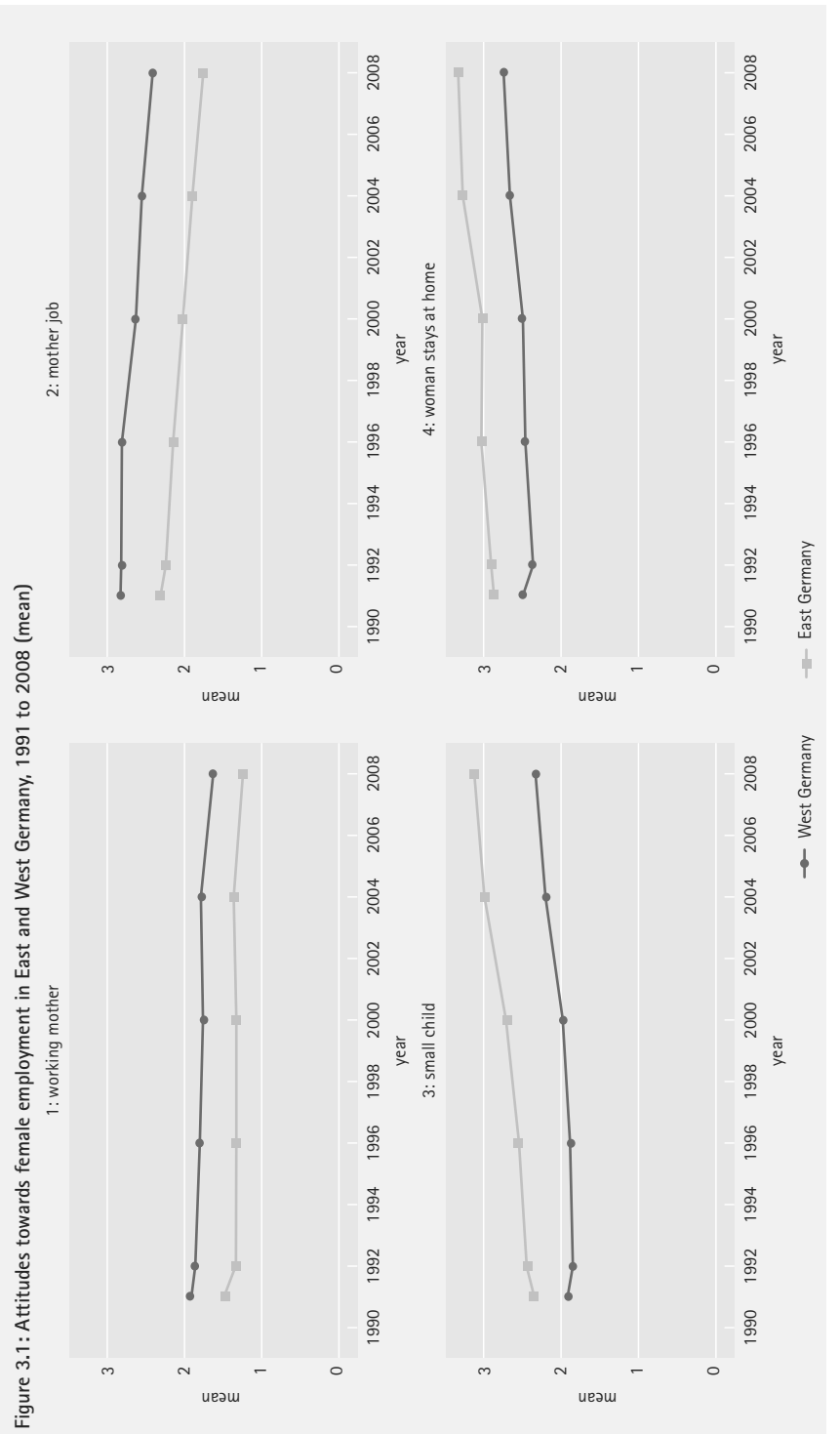


Figure 3.1: Attitudes towards female employment in East and West Germany, 1991 to 2008 (mean)

continue to reject the male breadwinner model. In summary, different attitudes towards female employment have contributed to differences in the development of women's labour force participation in East and West Germany following reunification. However, the causality remains unclear because although these attitudes certainly affect employment behaviour, these attitudes are also likely to be inversely influenced by current and past employment behaviour (Rosenfeld, Trappe and Gornick 2004).

3.5 Theoretical background

3.5.1 Institutional regulations and cultural expectations

The relationship among welfare state arrangements, institutional regulations and reforms at the macro level and the labour force participation of women with and without children on the micro level has already been studied frequently (e.g. Lewis 1992; Geyer and Steiner 2007). These institutional arrangements include maternity leave, parental leave or parental allowance as well as the promotion of child care and the joint taxation of married couples. The welfare state directly affects access to resources, creates infrastructure or enforces social policies. However, in addition to a direct influence, there is an indirect influence of normative and cultural expectations regarding 'reasonable' behaviour in a society. This indirect influence has been given significantly less attention so far (Lewis 1992). However, cultural expectations may modify the effects of welfare state policies on the behaviour of individuals (Pfau-Effinger 2005). Thus, both institutions and the prevailing gender culture in a state play important roles. In the corporatist-statist welfare state type (Esping-Andersen 1990, 1999) to which (West) Germany belongs, one of the prevailing norms is that women, especially those who have small children, assume child care and family obligations. In contrast, men fulfill their role as financial providers for their families (Hummelsheim 2009; Hummelsheim and Hirschle 2010). In the socialist welfare state of the GDR, the role of women was defined differently. Women, including those with small children, were expected to be active on the labour market. The state assumed control of child care tasks and ensured that child care was available to all citizens. Thus, to some extent, the state enabled the reconciliation of work and family.

Therefore, the following hypothesis can be presented. First, I assume that the average durations of family related career interruptions differ for women who lived in the FRG and GDR before the German reunification. In addition, after the German reunification, the interruptions are assumed to differ for women from East and West Germany. In general, interruptions in the GDR are expected to be

significantly shorter than those in the FRG. These differences can be ascribed to institutional regulations, the orientation of family policies and the predominant gender culture.

The institutional approach to gender research (Krüger 2004) explains why attitudes and norms regarding the employment of women are important over a longer period. These norms and attitudes are subject to constant societal change and are progressing towards modern, equal gender roles for men and women. However, it appears to be problematic that traditional gender roles are anchored in social structures and institutions that include parental leave regulations, child care and joint taxation of married couples. This anchor in social structures and institutions indicates that preferences and the changes in behaviour that result from such preferences occur only gradually over time. This gradual change in behaviour suggests that the labour force participation of women in West and East Germany is expected to change slowly over time. In the West, one can expect slowly rising employment rates, in the East slowly falling employment rates.

3.5.2 Family, education and welfare state systems as socialisation agencies

The theoretical considerations of Ridgeway (1997) also provide a micro-level explanation why the labour force participation of women increases slowly despite changing conditions over time. Individuals are constantly in contact with other individuals in their society and are influenced by the behaviour of others. This influence implies that women in both West and East Germany generally remain in one place because of their unwillingness to move. Consequently, these women base their behaviour on the behaviour of other women in their environment. Thus, a type of 'invisible hand' (Ridgeway 1997: p. 218) is expected to transfer preferences regarding the intra-family division of labour and the labour force participation of women and mothers to a changing socio-economic and institutional context.

The inclusion of the micro level also enables more precise assumptions regarding the effect of cultural expectations and institutional regulations on individuals. Socialisation theories (Hagemann-White 2004; Hurrelmann 1978; Hurrelmann, Grundmann and Walper 2008) explain the individual appearance and social reproduction of gender norms through social learning in typical areas of experience in childhood and adolescence. Socialisation means that an 'external reality' (e.g. family or educational institutions) influences the development of a person (Hurrelmann, Grundmann and Walper 2008). However, 'inner development' (Hagemann-White 2004: p. 148), which refers to the basic structure of personality, is also important. Preferences are transferred from parents to children in this phase

of development, especially within a family, as the primary socialisation agency, and social structures are also internalised in this phase. This socialisation shapes the personality development of an individual. Another secondary socialisation agency is the educational system in which social knowledge is transferred (Hurrelmann 2002). According to this approach, socialisation, which occurs during childhood in families, schools and society, shapes the future life course and individual preferences with regard to child-rearing responsibilities and the employment of women with small children.

With respect to the labour market participation of women with children, one can derive the following hypotheses. The socialisation theory predicts that the behaviour of women is influenced by the experiences that they acquire in childhood and youth. Women who were born in the West are expected to follow the principle that women should take care of their children at home at least until their children are of school age (Pfau-Effinger 2005). Because these women have often been raised by non-working mothers, they are socialised in accordance with this principle. Thus, the behaviour of these women corresponds to the modified breadwinner model. Likewise, women who were born in the East should tend to prefer that both women and men should be gainfully employed, and such a preference would correspond to the dual breadwinner model (Lewis 1992). This preference is consistent with socialisation theory and is supported both by the transfer of values in the educational system of the GDR and by the employment of the majority of mothers in the GDR, whose children were familiar with this situation.

One group of people who can provide insight regarding the importance of socialisation theories are women who were born and raised in the GDR but decided to live in West Germany after the German reunification and gave birth to their children in the West. It is theoretically unclear whether these women are more likely to uphold and prefer the ideals of their childhood or pragmatically adapt to the conditions in the West. This adaptation could for example also be due to a non-availability of child care facilities. Thus, women who were born in the GDR and moved to one of the old federal states after the German reunification constitute an interesting group to study. Ridgeway (1997) predicts that these women would adopt their behaviour to their new surroundings in West Germany because of their constant contact with other women in the West.

3.6 Data and methods

To investigate the research questions, I use data from the study 'Working and Learning in a Changing World' (ALWA). This survey was conducted on behalf of the Institute for Employment Research (IAB) of the Federal Employment Agency

(BA) from September 2007 to March 2008. The aim of this representative survey was to retrospectively collect the life histories of approximately 10,000 adults who were born between 1956 and 1985 (Antoni et al. 2010, 2011; Kleinert, Matthes and Jacob 2008). In addition, family related employment interruptions were explicitly addressed by asking the respondents to describe their experiences with parental leaves in connection with the birth of a child. ALWA also contains the complete employment, training and unemployment histories of all respondents prior to the interview date and longitudinal information regarding the family contexts, children and partners living in their households.

The event that is analysed with event history modelling is employment re-entry following an employment interruption due to the birth of a child. The analysis is limited to women, as family related employment interruptions in Germany occurred almost exclusively for women during that period. In ALWA, only approximately 100 family related career interruptions for men can be found over the entire observation period. A family related employment interruption is defined as follows: an interruption begins with the birth of a child and ends with either (re-) entry into employment of 15 hours or more[13] or an unemployment phase, regardless of whether the phase was reported to the employment agency by the target person. In addition, the differing structural conditions and preferences in East and West Germany concerning the behaviour of women in registering for unemployment and their self-reported homemaker status are considered. Therefore, unemployment is also considered to be an employment re-entry despite the fact that it could not be realised.

The analysis includes women who worked before an interruption and a small number of unemployed women or women who were still in training before giving birth (see also Falk and Schaeper 2001; Schaeper and Falk 2003). Re-entries into full- and part-time employment are not distinguished because it is unclear whether part-time work was desired or determined by general conditions (such as limited child care facilities). Re-entries into training or education are excluded from the analyses; however, from an empirical perspective, these re-entries occur only rarely.[14]

All employment interruptions that occurred in or after January 1980 in both the FRG and the GDR are taken into consideration. First, the employment interruptions

13 This hour limit represents the current definition of the Federal Employment Agency (BA). A person who is available for less than 15 hours per week cannot be considered to be unemployed or seeking work. In addition, the limit often represents the minimum limit for regular employment that is subject to social insurance contributions.

14 For a woman who has another child during her employment interruption, the first episode is right censored, and a new episode begins. This process was more likely to occur after 1992 because the statutory parental leave period was 36 months after that year; thus, the likelihood of having another child within a leave period increased. Employment interruptions of less than three months were excluded from the analyses because these interruptions were likely to be misreported maternity leaves.

in the FRG and the GDR prior to reunification are examined. Subsequent analyses concentrate on employment interruptions that occurred after the German reunification from October 1990 to 2006. Due to a limited number of available cases and several of employment interruptions that were not completed at the interview date, the period from 2007 onwards is excluded from the analysis.[15]

For both the descriptive and multivariate analyses, event history analyses are used (see Blossfeld, Golsch and Rohwer 2007). Because the information in ALWA was collected on a monthly basis, the process time is measured in discrete time units. The event data are converted into a person-period file.[16] The dependent variable measures for each month of the interruption period whether a re-entry occurred. Thus, the data are analysed with event models for discrete-time units (Singer and Willett 2003).[17] Time dependence is modelled by grouping into intervals of 6, 12, 15, 18, 24, and 36 months and the maximum observed time. This grouping is based on the various statutory parental leave durations and an exploratory analysis of re-entries. Separate models for the FRG and the GDR prior to reunification are estimated. Subsequently, one common model for reunified Germany and separate models for the old and new federal states following reunification are calculated.

The model specification includes both time-constant and time-varying covariates at the individual and institutional levels. A time-dependent variable is included in the models and indicates whether the woman was entitled to statutory parental leave at the respective time because she is not an employee, and e.g. self-employed or unemployed. More precisely, for this variable, the different statutory regulations in Germany at different points in time are included. The models also contain a time-constant variable that indicates whether a woman lived in the GDR or the FRG in June 1989. The variable provides information regarding the type of political system that socialised each woman during childhood. Another variable that relates to socialisation is whether the mother of a woman was employed when the woman was 15 years old. In the descriptive analysis, different child birth cohorts (1980–1985, 1986–1990/1991, 1992–2000, 2001–2006) are distinguished; these cohorts are based on the major changes in parental leave legislation described in Table 3.1.

15 Of course, the group of women who interrupt their activity due to the birth of a child and the group of women who reported having a child are selective. However, this selectivity is not the subject of analysis.

16 A person-period file contains for each women and each interruption one observation per month. The resulting dataset becomes large. However, modern computing facilities can deal with these datasets without problems.

17 More precisely, I use a proportional hazard model with an additional error term that controls for individual-specific time-constant unobserved heterogeneity (Jenkins 1995, 2005; Rabe-Hesketh and Skrondal 2008; Steele 2008, 2011). The model roughly corresponds to a piecewise-constant exponential model for continuous time (Blossfeld, Golsch and Rohwer 2007; Steele 2011).

Based on previous research results, the models contain a number of other time-dependent control variables. Because the economic situation of a woman is also relevant to her re-entry decision (e.g. Becker 1991; Bryant and Zick 2006) in addition to cultural norms and institutional arrangements, the educational level of women (low: no training degree, medium: training or technical school degree, or high: university degree or similar) and marital status (married: yes or no) are included as controls. Moreover, the age of a woman in years and her number of children (one child, two children, or more than two children) are considered as categorical variables. The model contains information regarding a woman's work experience (in decades) prior to her employment interruption.

Unfortunately, the child care coverage on a regional basis (e.g. administrative districts) is only available from 1992 onwards and since 2006 regional data are available on a yearly basis. Between 1985 and 2002, only aggregated data for the different federal states measured at a time interval of four years exist. In 2002, the mode of calculation of this statistic also changed making results until 2001 and results from 2002 onwards not comparable any more. So, due to data unavailability, the child care availability cannot be controlled for. However, previous research including this rate show mixed results: Kreyenfeld and Hank (2000) find no significant impact of child care provision rate on part-time and full-time employment. Frodermann (2011) also does not detect a significant impact of child care provision when examining re-entries of mother in full-time employment or employment in general. However, for re-entry into part-time child care exhibits a positive influence. Grunow and Müller (2012) find a weakening influence of being an East German mother when including child care provision. Moreover, in chapter 2 I showed that for West German mothers the provision of child care did not have a significant influence on employment re-entry.

3.7 Family related employment interruptions in East and West Germany and the GDR

3.7.1 The duration of employment interruptions: West and East Germany in comparison

The length of family related employment interruptions following the birth of children is shown in Figure 3.2. Here, I examine births prior to the German reunification and distinguish between two time periods. The first period includes employment interruptions between 1980 and 1985. At that time, relatively short periods of parental leave were guaranteed by law in the FRG. In the GDR, parental

leave was guaranteed only for mothers with two or more children. The second period includes the years from 1986 to 1991 for the FRG and the period from 1986 to May 1990 for the GDR. During this time, the legal regulations in the FRG were gradually extended, and in the GDR, the *baby year* was also granted for mothers with only one child.[18]

Figure 3.2: Kaplan-Meier failure curve of employment interruptions, FRG and GDR before reunification

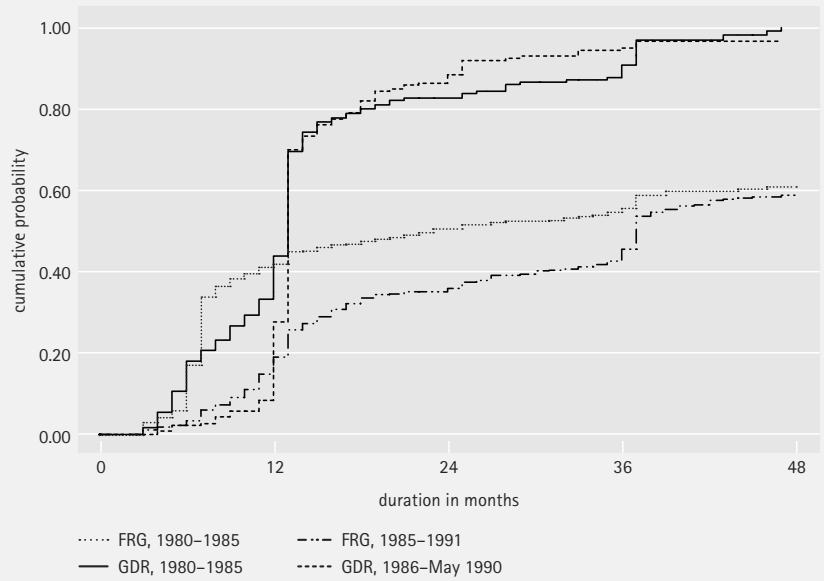


Figure 3.2 shows that the employment interruptions of mothers in the FRG were longer than those of mothers in the GDR. Striking differences are also apparent in the cumulative return rates. These differences are significant at the 1 per cent level as indicated by log-rank tests (see Blossfeld, Golsch and Rohwer 2007). In the GDR, approximately 70 per cent of mothers returned to the labour market 12 months following birth, and 82 per cent of mothers returned after 24 months. Four years following birth, the return rate reached almost 100 per cent. This pattern corresponds to the political ideal of almost uninterrupted careers of both men and women. The pattern also reflects the social conditions of the GDR with full-time employment as standard form of employment, e.g. marginal employment did not exist in the GDR. In addition, official unemployment statistics

18 The transition period after the fall of the wall until the Unification Treaty on July 20, 1990 is not completely excluded due to the low number of cases in the GDR.

are not available, and most companies were owned by the state.[19] Furthermore, the number of infants in full-time public child care was high (Frerich and Frey 1996: p. 403).

The return rates in the FRG were considerably lower: prior to 1986, these rates reached approximately 20 per cent after 12 months and approximately 35 per cent after 24 months. For employment interruptions that began in or after 1986, these rates amounted to approximately 40 to 50 per cent. Four years after the birth of a child, only approximately 60 per cent of women returned to work. Within this period, both the parental leave system and the recessive economic situation in West Germany (which was accompanied by high unemployment) prompted extensive interruptions. In addition, a comprehensive system of child care for children under three did not exist at that time, and even for older children of kindergarten age, mainly half-day child care was available. Furthermore, the school system was designed to be compatible with this half-day child care system, and school often ended in the early afternoon. Women in the GDR showed scarcely any differences at the various time points. Most women in both cohorts returned to their jobs at the end of the first year, which corresponds to the statutory maternity leave of the *baby year*. This consistent finding signifies the importance of institutional regulations for family related employment interruptions in both states.

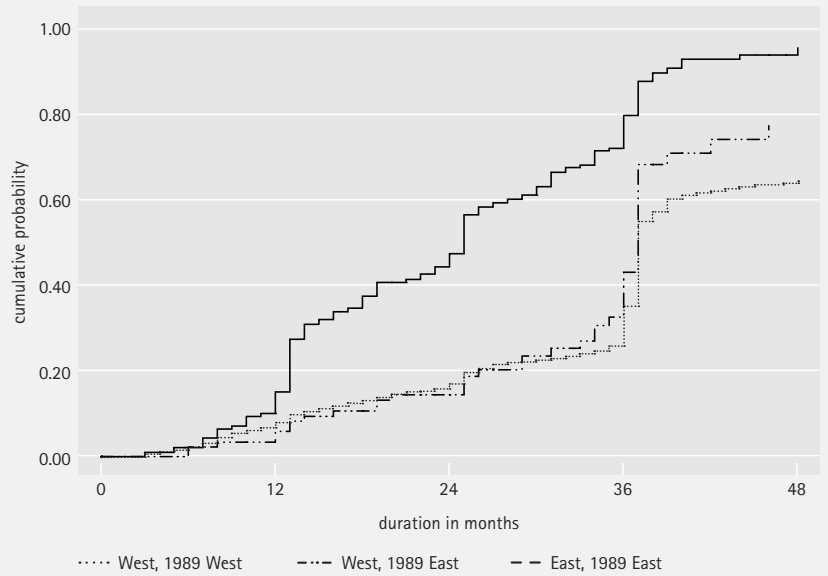
3.7.2 The duration of employment interruptions after the German reunification

The development of the duration of employment interruptions following reunification is shown in Figure 3.3, which separates the old and new states for the period beginning in 1991. In addition, whether the women under study resided in the GDR or the FRG in 1989 is distinguished to address the political system under which these women were socialised. Women who had lived in the old states in 1989 and re-entered in one of the new states are not treated separately because of the small sample size for this group. For *parental leave* periods that ended in the old federal states, a drastic increase in cumulative return probability occurred after approximately three years, and this increase corresponds to the expiration of statutory parental leave. The development of the duration of employment interruptions following reunification is shown in Figure 3.3. Women from the East who moved to the old federal states appear

19 In reality, 'hidden unemployment' existed in the GDR; that is, production capacity was far from being fully exploited (Gürtler, Ruppert and Vogler-Ludwig 1990).

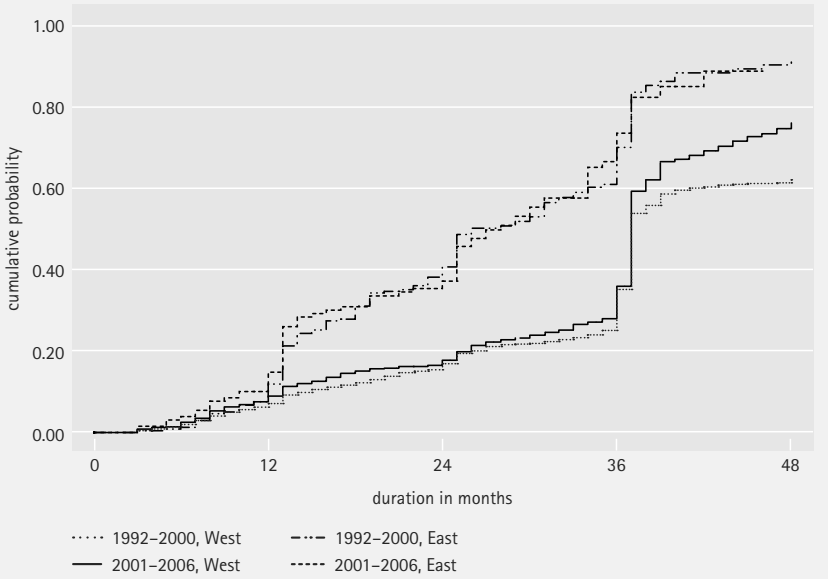
to have adapted their interruption behaviour to the behaviour of West German women. This adaptation pattern suggests that institutional factors, such as the provision of public child care, play a more important role than socialisation in childhood. In the old states, approximately 60 per cent of women returned to employment after four years. Thus, the cumulative return probability was greater than the return rate prior to reunification.

Figure 3.3: Kaplan-Meier failure curve of employment interruptions, place of residence in 1989



The results differ for women who had lived in the GDR in 1989 and chose to remain there. Some women had already returned to the labour force at the end of a child's first year of age. In this context, the *baby year* that was established in the GDR era continues to have a clear effect. The return rate corresponded to approximately 20 per cent after one year and was almost twice as high as that in the old federal states. After the first year and until approximately three years following birth, the return rate increased steadily. After three years, the return rates increased at approximately the time of the expiration of statutory parental leave, although this increase is less pronounced than that in the West. In total, four years following birth, approximately 95 per cent of women in the East re-entered the workforce. The curves resemble those of the interruptions before the German reunification in 1990. These curves also partially reflect the greater likelihood that women in the East report being unemployed. The development of the interruptions in the new and old federal states and whether they converge over time can be observed in Figure 3.4.

Figure 3.4: Kaplan-Meier failure curve of employment interruptions, time dependency and place of residence in 1989



For women who lived in the GDR in 1989 for the two cohorts for 1992–2000 and 2001–2006, similar patterns emerge. After two years, approximately 50 per cent of these women returned to employment or were registered as unemployed, and after four years, this rate approaches 90 per cent. In addition, women who lived in the FRG in 1989 experienced few changes over time. In the 1992–2000 childbirth cohort, only approximately 20 per cent of all women had returned to the labour market after two years, and 60 per cent had returned after four years. After four years, this number reached approximately 70 per cent for the 2001–2006 cohort. In addition to institutional arrangements, biographical factors, including aspects of socialisation, may crucially influence return behaviour. However, differences in public child care availability may also be responsible for this unequal development. The differences between women who were raised in the GDR and those who were raised in the FRG are striking and apply to younger cohorts. A convergence of the re-entry pattern is visible only for the first year of employment interruptions. Subsequently, this pattern is scarcely visible. Only the cumulative re-entry probabilities for women from the GDR declined across cohorts; in contrast, these rates increased for women in the FRG. Because of the small number of women from the GDR, a multivariate analysis is not appropriate.

3.7.3 Factors that influence return after family related employment interruptions: GDR and FRG in comparison

In addition to East-West differences in Germany after the reunification and differences between the former GDR and the FRG, individual and institutional characteristics are expected to influence return after family related employment interruptions. These factors are examined in a multivariate framework (Table 3.2). First, I compare the FRG (Model 1) and the GDR (Model 2) and the time span prior to German reunification.[20]

In sum, similar factors were operating in the two states. Institutional arrangements were meaningful in both the FRG and the GDR. Within the statutory parental leave period and for the individuals who were not entitled to benefits (e.g. women who were self-employed or unemployed prior to the birth of a child), the return probability was lower than for those women whose job guarantees has extinguished. The employment circumstance of the mother of the woman during the adolescence of the woman has no significant effect. This result suggests that socialisation played only a minor role – at least when socialization and the decision to move are independent from each other. In both the FRG and the GDR, education was found to have a weak effect: women who have completed higher education returned to work more rapidly than women with lower levels of education. This effect is consistent with general expectations of human capital theory. A similar influence was also found for family status: in both countries, being married reduced the rate of re-entry. No influence in the GDR and only a weak influence in the FRG are found for the labour market experience of a woman.

In the models, the only difference in the influencing factors in East and West Germany was found for the number of children living in a household. In the FRG, a higher number of children decreased return probability, but this result was not found for the GDR. This result may reflect the lack of availability of public child care which cannot be controlled for in the models. Women in the West with more children experience greater difficulties in reconciling work and family. Conversely, a well-developed public child care system was available in the GDR; thus, women in the GDR with a higher number of children did not necessarily report having child care problems.

20 The factors that influence the dependent variable in the discrete-time event history models are presented in hazard ratios. Hazard ratios of less than one indicate reduced re-entry probability, and values greater than one indicate increased re-entry probability.

Table 3.2: Discrete-time event history models on the likelihood to re-enter the labour market before the German reunification in the FRG and the GDR

	Model 1 FRG	Model 2 GDR
Education (ref. high: university degree or similar)		
Low: without training degree	0.593 (0.239)	0.292 (0.241)
Medium: training or technical school degree	0.571*** (0.095)	0.794 (0.217)
Parental leave (ref. right expired)		
Entitled to parental leave	0.064*** (0.001)	0.199*** (0.054)
Not entitled to parental leave	0.052*** (0.020)	0.241* (0.164)
Number of children in household (ref. one child)		
Two children	0.745*** (0.077)	0.964 (0.202)
Three children or more	0.492*** (0.085)	0.662 (0.223)
Married	0.343*** (0.067)	0.828 (0.215)
Woman's age	0.968*** (0.014)	0.987 (0.020)
Employment experience	1.003*** (0.001)	0.997 (0.002)
Mother of woman employed	1.344 (0.219)	0.836 (0.574)
Observations (person months)	99,114	10,282
Number of events	1,297	289
AIC	11,763.4	2,521.7

Hazard ratios (exponentiated coefficients); standard errors in parentheses, time-dependency not displayed.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3.7.4 Factors that influence the duration of employment interruptions: GDR and FRG in comparison after the German reunification

The research question regarding the type of factors that influence the duration of and exit from a family related employment interruption following German reunification is first examined in a joint model for the old and new federal states (Table 3.3). The results of the complete model for the old and the new federal states (Model 3) indicate that the transition rate was considerably smaller within the statutory parental leave period than after the expiration of statutory parental leave. Even women who did not have a statutory right to parental leave had a lower rate of return to employment. In the overall model, women who had lived in the GDR in 1989 were not more likely to re-enter the workforce than women from the GDR. Furthermore, whether the mother of a woman was employed was found to be not important. Again, this result preliminary indicates that socialisation has minor relevance.

The number of children exerted a significant influence: women who had two or more children had a significantly lower re-entry rate than women who were out of the labour force as a result of their first parental leave period. Moreover, the level of educational attainment influenced re-entry probabilities following reunification. Women who had medium or low levels of education had a lower employment return rate compared with mothers with higher levels of education. Married women who were probably partially covered by the incomes of their husbands and did not financially rely on their own incomes also had lower transition rates. Conversely, the labour force experience of a woman was found to have no influence.

When examining separate models for the old and new federal states, one observes similarities between the results for the old states (Model 4) and those of the full model (Model 3). This finding is not surprising because the results in the overall models are driven by the higher number of cases in West Germany. However, even in this model, no differences were observed in the re-entry behaviour of women who had lived in the GDR in 1989 compared with that of women who had lived in 1989 in the FRG. Therefore, the behaviour of women who were socialised in the GDR but now live in the old federal states did not differ from that of women who were socialised in the FRG. However, this group could also be selective which could in turn bias the results.

Table 3.3: Discrete-time event history models on the likelihood to re-enter the labour market after the German reunification in Germany, old and new federal states

	Model 3 Germany	Model 4 Old federal states	Model 5 New federal states
Education (ref. high: university degree or similar)			
Low: without training degree	0.544 (0.197)	0.567 (0.226)	0.279 (0.204)
Medium: training or technical school degree	0.612*** (0.089)	0.568*** (0.093)	0.819 (0.218)
Parental leave (ref. right expired)			
Entitled to parental leave	0.077*** (0.008)	0.065*** (0.008)	0.215*** (0.063)
Not entitled to parental leave	0.066*** (0.022)	0.054*** (0.020)	0.188* (0.116)
Number of children in household (ref. one child)			
Two children	0.788** (0.076)	0.746** (0.076)	0.868 (0.181)
Three children or more	0.508*** (0.079)	0.496*** (0.084)	0.603 (0.212)
Married	0.501*** (0.081)	0.372*** (0.070)	0.946 (0.243)
Woman's age	0.968** (0.013)	0.969** (0.014)	1.000 (0.029)
Employment experience	1.002 (0.001)	1.003* (0.001)	0.997 (0.002)
Mother of woman employed	1.346 (0.204)	1.309 (0.213)	2.260# (1.078)
Lived in the East in 1989	6.797 (1.469)	0.810 (0.339)	
Observations (person months)	109,396	101,737	7,659
Number of events	1,587	1,330	257
AIC	14,227.1	12,254.5	2,162.2

Hazard ratios (exponentiated coefficients); standard errors in parentheses, time-dependency not displayed.
# $p < 0.10$,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In the new federal states (Model 5), the statutory parental leave regulations played a similarly important role as in the old federal states. In contrast with the old federal states, the employment of mothers in the new states had a significant positive effect on the 10 per cent significance level on the probability of return; thus, this result indicates that socialisation aspects are probably relevant. The number of children in a family was not important; this finding can again be attributed to the broad availability of public child care even after the German reunification. Moreover, the effects of educational attainment are less clear than in the old federal states. However, this could also be a hidden effect of child care unavailability because higher educated women in the old federal states can afford public or private child care more easily. No effect in the new federal states was found for the marital status of a woman. This result suggests that marital status was of less importance in East Germany. In summary, institutional regulations and conditions appear to be more important than socialisation aspects. The effects of the control variables largely confirm the results of previous studies (e.g. Aisenbrey, Evertsson and Grunow 2009; Grunow, Hofmeister and Buchholz 2006; Weber 2004).

3.8 The long road to uniform re-entry patterns

Together, the results show that significant differences between women in East and West Germany in terms of the duration of family related employment interruptions persist even twenty years after the German reunification. Although the trajectories of employment interruptions for mothers in the East and West appear to converge, one cannot truly speak of a convergence of patterns even today. As observed in past decades, remarkable differences between the East and West German population remains. The influence of attitudes with respect to female employment and the employment of mothers may contribute to the continuation of these differences. Nevertheless, interruption patterns for East German women following reunification more closely resemble the patterns of women in the West than the patterns of mothers in East. Falk and Schaeper (2001) obtained similar results. Regardless of the length of legally guaranteed parental leave with a right to return to their previous employers, women tend to use this entire period. This pattern shows that family related employment interruptions are generally subject to strong institutional control, as specifically shown by the effect of the three-year job-protection period.

Women who were raised in East Germany and moved to the West after the reunification had long employment interruptions that were similar to those of West German women. This similarity suggests that institutional regulations were more

relevant to re-entry behaviour than socialisation. One must also consider that the group of women who moved to West Germany could be a selective group. This selectiveness could have biased the results. However, the most important reason for a relocation decision was likely to be the tight labour market situation following reunification. In addition, employment decisions, especially those of married women, are made in a partnership context. Thus, when East German women had West German partners, such partnerships could also affect participation decisions. Unfortunately, this possibility cannot be investigated because of the lack of information pertaining to the residential history of partners. In addition, due to the unavailability of child care coverage for the entire time span, the results must be interpreted carefully although previous research did show an ambigous role of child care coverage on female employment.

Nonetheless, socialisation and familial imprinting cannot be neglected: for example, when examining the relevance of marital status in West and East Germany, one can conclude that marriage is more closely linked to the role that men assume as family breadwinners in West Germany than in East Germany. Moreover, the tendency to marry is more pronounced in the old federal states than in the new states. In addition, the employment of the mother of a woman plays a role in the new states but is not relevant in the old states. The descriptive results also indicate the importance of family characteristics. Unfortunately, an unambiguous answer to the research question is unattainable at this point because of the limited number of cases and the lack of information regarding local child care availability rates. With a higher number of cases it would also be possible to examine West German women and their behaviour when moving to the East.[21]

Long-term employment interruptions in West Germany are particularly problematic from the perspective of labour market and social policy because these interruptions can reinforce social inequalities. This reinforcement can occur because knowledge and skills that are useful in the labour market are not used during these periods and, thus, depreciate over time. This view of the effect of interruptions on knowledge and skills is often held by potential employers. The microeconomic theory (see Mincer and Ofek 1982) also names this as human capital depreciation. Family related employment interruptions also contribute to increasing gender wage differentials because no work experience is acquired during interruptions (Beblo and Wolf 2003). Therefore, family related employment interruptions contribute to gender inequality in life courses. From a social policy perspective, women earn only small pensions during their inactivity, and these

21 Grunow and Müller (2012) have now filled this gap with analyses of the BASiD data which combines pension register data and employment data but lacks information on family circumstances like partnership status, age and number of children.

smaller pensions may contribute to poverty in old age. In the long term, differences in family related employment interruptions could lead to differences in the old-age incomes of West and East German women and thus lead to new inequalities in Germany (Strauß 2010).

In 2007, a radical reform of parent leave schemes was introduced, and this reform may lead to a permanent change in the interactions of institutional reforms and individual characteristics. Therefore, the persisting differences between East and West Germany can eventually be overcome as a consequence of this reform and other social changes, such as the ongoing improvement of public child care where still large differences between East and West Germany exist. Furthermore, the generation of women who were raised in unified Germany after 1989 will become mothers in the near future. The manner in which their employment interruptions develop represents an interesting future research area.

4 Improving retrospective life course data by combining modularised self-reports and event history calendar. Experiences from a large scale survey[22]

Abstract

Event history calendars (EHC) have proven to be a powerful tool for collecting retrospective autobiographical life course data. One problem is that they are only standardised to a limited extent. This restricts their applicability in large-scale surveys. However, in such surveys, a modularised retrospective CATI design can be combined with an EHC. This data revision module is directly integrated into the interview and used as a data revision module, allowing insights from cognitive psychology to be applied. The data revision module stimulates the respondent's memory retrieval by detecting both temporal inconsistencies, such as gaps, and overlapping or parallel events. This approach was implemented in the IAB-ALWA study (Working and Learning in a Changing World), a large-scale representative telephone survey involving 10,000 respondents. By comparing the uncorrected data with the final data after revision, we can investigate to what extent the application of this data revision module improves data quality or, more precisely, time consistency and dating accuracy of individual reports.

JEL classification: C42, C81, C83

Keywords: Event history calendars, large-scale survey, retrospective life course reports, survey methodology

4.1 Introduction

Retrospective life course surveys collect information on the characteristics and the dating of past episodes. Thus, event history data are extremely valuable for the analysis of life courses and long-term social change (Blossfeld, Golsch and Rohwer 2007). Additionally, to be useful for statistical analysis, event histories must, as far as possible, meet two criteria: they have to be complete and consistent. Completeness demands that information on one or more episodes is available

22 This extended chapter is authorized by the original copyright holder Springer Science+Business Media B.V. and is an extended version of: Drasch, Katrin, and Britta Matthes. 2013. Improving Retrospective Life Course Data by Combining Modularized Self-Reports and Event History Calendars. Experiences from a Large Scale Survey. Quality & Quantity, 817–838. doi: 10.1007/s11135-011-9568-0. With kind permission from Springer Science+Business Media B.V. A slightly different version of this article is also available as: Improving retrospective life course data by combining modularized self-reports and event history calendars: experiences from a large scale survey. In: IAB Discussion Paper 21/2009, Nuremberg, 37 p. (joint with Britta Matthes). All remaining errors are of course ours.

for the whole time period under investigation. For instance, information may be lacking about an individual's activities after finishing school and before starting university. This indicates incomplete data because we do not know whether the individual worked, was unemployed, or simply went on holiday during that time. The second criterion, consistency, means that the collected information must not be contradictory, neither regarding the timing of events nor with respect to substantial matters. A temporal as well as a substantial contradiction would be, for example, if an individual reported being engaged in military service and being employed full-time simultaneously. In summary, incomplete or inconsistent life course reports are considered visible signs of individual autobiographical memory failure.

In recent years, applied researchers have used increasingly aided recall techniques to overcome recall errors. Various methods, such as the use of landmark events (e.g. a person's marriage date), the reconstruction of autobiographical information with event history calendars (EHC), or the collection of data in a domain specific context with modularised reports can be applied to stimulate autobiographical memory. Several experimental studies have demonstrated the effectiveness of recall methods (e.g. Belli et al. 2004; Belli, Shay and Stafford 2001; van der Vaart 2004). Applying these methods has an influence on recall accuracy in terms of completeness, dating accuracy and characteristics of an episode (for an overview see Glasner and van der Vaart 2009).

In the IAB-ALWA (Working and Learning in a Changing World) study we use a combination of aided recall techniques throughout the interview. The project is located at the Institute for Employment Research (IAB). For an overview of this survey we refer to Kleinert, Matthes, and Jacob (2008). We combine modularised self-reports and event history calendars to improve consistency and completeness of the autobiographical data collected retrospectively as a hybrid questionnaire design. The event history calendar itself is used as a data revision module. We employ the EHC to detect and resolve inconsistencies in collaboration with the respondent during the interview, and not as initially suggested as a plausibility check after the interview process is finalised. The interview process itself is highly standardised. The implemented survey instrument uses insights from cognitive psychology and integrates these insights into the survey design. This is done in order to stimulate autobiographical memory to a greater extent than has been achieved in previous studies. Apart from experimental studies (Matthes, Reimer and Künster 2007; Reimer and Matthes 2007; van der Vaart and Glasner 2007), this is the first time that such a hybrid design has been applied in a large scale survey.

In past retrospective life course surveys, for example the German Life History Study (GLHS), the editing process was lengthy and costly because it took place

completely outside of the interview process itself. Thus, as well as improving the data quality, another reason for using this instrument is to guarantee the cost efficiency of the survey. This meant that every single case had to be edited after the interview by applying standardised rules for data editing, with the result that data quality is considerably enhanced (Matthes, Reimer and Künster 2007). However, editing life courses without the respondent being present is associated with a more severe and substantial problem. It is not always possible to derive comprehensive and unambiguous rules regarding the decision about which of the given information is most valid without contacting the respondent again (Hillmert 2002; Matthes, Reimer and Künster 2007) or alternatively but not necessary better using rules of thumb.

To our knowledge, no study exists that investigates the effectiveness of combined recall techniques in a large scale survey. Previous studies were of experimental design, using a split-ballot or assessed test-retest reliability. This chapter enriches research on the data quality of retrospective reports and adds an additional category (Glasner and van der Vaart 2009) on how to assess data quality: this category compares individual reports in a large scale survey, with and without a second stage of data collection. We thus compare the data before the data revision module was entered with the data produced after completion of the revision module. By applying such an approach, survey design can be used to overcome memory problems, at least to some extent. Moreover, this chapter sheds light on the question of whether certain groups of individuals benefit more from applying such recall techniques. Thus, the aim of this chapter is twofold: experiences with this hybrid design in a large scale survey will be reported and more detailed insights into the improvements in data quality will be provided. In particular, we focus on two common recall errors: the omission and the misdating of episodes. Omission refers to the completeness of the data, while misdating refers to consistency.

The outline of this chapter is as follows: we start with some selected empirical results on recall problems. Next, we provide some insights into the structure of autobiographical memory and how this structure can be used to design a standardised survey instrument. We then proceed with our empirical results on the effectiveness of such an instrument applied as a data revision module in a large scale survey. Finally, a summary and some practical conclusions and suggestions for further research will be given.

4.2 Previous research on recall differences

Intuitively, individual differences as well as characteristics of the episode itself are important in relation to recalling an episode (Klein and Fischer-Kerli 2000). Both attributes have been examined in several experimental and quasi-experimental

studies. Dating accuracy has been studied less frequently, at least in survey research. Thus, a concise selection of the results is presented in this paragraph.

Individual characteristics such as age and gender have frequently been examined in empirical research. With regard to the education of the respondents, however, research results are scarce. De Graaf and Wegener (1989) found that a higher level of education leads to more inconsistent answers. Regarding age, Elias (1997) states that older age groups (over 60 years) show less agreement when reporting unemployment compared to younger age groups. Paull (2002) also asserts that recall errors occur more frequently for older people. Gender differences in the autobiographical recall and dating of events have been frequently studied (cf. also Auriat 1991; Paull 2002; Reimer and Matthes 2007). Skowronski and Thompson (1990) conclude that women are better at both remembering and dating events, while Klijzing and Cairns (1998) show that the failures to remember the month or year of an event are more pronounced for men than for women. In addition, they state that the recall lapse increases with age.

Furthermore, characteristics of the episode itself have been examined, for example, the type of episode and the complexity of life histories. Reimer and Matthes (2007) find differences in recall depending on the type of episode and the length of the episode. Respondents are more likely to forget short episodes and those that are regarded as unimportant (Barclay 1988). Belli et al. (2007), confirming earlier research by Mathiowetz and Duncan (1988), who state that spells of unemployment are particularly weak in data quality. By contrast, episodes of employment are usually clearly remembered. Paull (1997) also shows that periods of unemployment are especially error prone. Dex (1995) observes that short periods of unemployment are often omitted, and points out that, among other factors, the saliency and the temporal reference of events has an effect on human recall. Also, similar events over time become more difficult to remember as the time lapse increases (Groves et al. 2009). Dating errors are influenced by the ability to remember the event at all. Often misdating an event by some systematic calendar related factor occurs, such as by one year (Huttenlocher, Hedges and Bradburn 1990). These errors depend largely on the time-lag of the episode and the time of potential retrieval (Rubin and Baddeley 1989). The omission of episodes is considered to be a function of the temporal distance to the event (Paull 2002). Peters (1988) finds that recall errors are reduced by 3 to 4 per cent per year closer to the interview date. To produce these results, she assessed the respondent's family status with a maximum memory period of 15 years and an average retrospective interval of five years. With the increasing complexity of life histories, recall error might become worse, but little indication of this increasing error is likely to be apparent in the data. The reason for this is that visible errors

do not increase corresponding with complexity of lives, because respondents tend to smooth out their life courses (Reimer 2001).

The results of previous experimental research have lead to some general expectations about the effectiveness of the data revision module in the IAB-ALWA survey. On the one hand, we expect to find individual differences. First, we assume that men and women differ in remembering and dating events. Second, we generally presume an age effect; whether this effect will already be visible for the age group under investigation (18–52) remains to be examined. Third, an educational effect, meaning that more highly educated people make less use of corrections, is anticipated. However, we think that this effect might be levelled out by the increasing complexity of the life courses of better-educated individuals.

On the other hand, we expect effects related to characteristics of the episode. First, we assume that the episode's type is significant for remembering and dating episodes. Second, we assume that the longer an episode lasts for, the more likely it is to be remembered already before entering the data revision module. Third, we hypothesise that the number of episodes already reported reduces the chance of recalling a further episode. Finally, we propose that, for both remembering and dating events, it is important to evaluate how much time has elapsed since the episode took place. This denotes the time-lag to the interview date.

4.3 Theoretical background: The structure of autobiographical memory and memory pathways

In the following paragraph we give a brief overview of the most important attributes of autobiographical memory.[23] These attributes serve as the theoretical background for the design of the IAB-ALWA instrument. Cognitive psychology has found that autobiographical human memory is organised as follows (Barsalou 1988; Conway 1996; Conway and Pleydell-Pearce 2000): retrospections that are related to certain events in an individual's life course are organised in the long-time memory as a network of mental representations connected by different pathways. Three types of pathways are distinguished (cf. Reimer and Matthes 2007): hierarchical pathways start with general memory and run to more specific memory; sequential pathways flow along a sequence of episodes that are connected temporarily or causally; parallel pathways shift between various levels of abstraction and make use of temporal parallelisms within or across life domains. Each of these types of

23 For more detailed insights of cognitive processes in self-reports we refer to Tourangeau (2000) for remembering events and Bradburn (2000) for dating events. For an overview of recall problems in retrospective surveys we refer to Reimer and Matthes (2007).

pathways can be utilised in a specific manner in order to stimulate the retrieval of autobiographic memory.

4.3.1 Hierarchical pathways to stimulate top-down retrieval

Conway's model (1996) of memory considers that autobiographical memory is hierarchically organised in packages, which contain thematic and temporal information. Episodes are distinguished according to their duration and/or relationship with the respondent into 'lifetime periods' (long-term extended episodes), 'themes' (specific domains), and 'general episodes' (Conway 1996).[24] This means that the life course of an individual is grouped into several domains that can, in turn, be organised into several general episodes. This allows top-down retrieval and thus the recalling or dating of specific events in the context of more general events. For example the lifetime period of 'working life' can be organised into several 'themes' such as training, employment or unemployment episodes. Once this general context is set, detailed information about 'general episodes', for example periods working with the same employer can be more easily retrieved. In sum, higher order structures can be used to stimulate the memory of more specific information (Barsalou 1988).

4.3.2 Separate chronological time-lines to stimulate parallel recall

Human memory is stored on an extended-episode time-line and arranged into episode types (Barsalou 1988). This means that episodes are organised in separate hierarchically and chronologically structured partonomies for various life domains. Furthermore, Barsalou (1988) proposes that different time-lines, for example, a time-line for school, work or relationships exist and that specific episodes that are associated with these domains are nested within each of those time-lines. For example, memory related to vocational training episodes is nested in the time-line linked to the job where the training took place. In turn, memory associated with this specific job is nested in general memory on work episodes. Furthermore, memory on these time-lines is organised chronologically, meaning that contiguous episodes are stored closely together.

4.3.3 Sequential pathways to stimulate dating of episodes

The theoretical notions of Barsalou (1988) indicate that memory that is related to episodes is incorporated into generic as well as specific episode-related knowledge.

24 A summary of Conway's model is given in Tourangeau, Rips and Rasinski (2000: pp. 75).

For example, individuals know that after finishing university education one usually starts working. This is part of the generic knowledge about the educational system. Where and when one started working is stored in the specific episode-related memory. Essentially, this means that episodes are usually not time-tagged (Wagenaar 1986). Cognitive psychology calls this type of memory structure calendar representation (Huttenlocher, Hedges and Bradburn 1990). Hence, a specific episode is not directly connected with a date, because the memory about this episode and its dating are not stored together. However, only very important or salient events are time-tagged. Therefore, the dating of episodes has to be reconstructed by the respondent, often instantaneously during the interview process, and thus can be regarded as especially error prone. In particular, memory related to the episode's year, other than events taking place every year like anniversaries or birthdays, is easily confused (Glasner and van der Vaart 2008).

4.3.4 Autobiographic memory retrieval problems

Parallel, sequential, and hierarchical pathways rarely give a true image of reality (Neisser 1988), but they often make 'sense of the past in the light of the present' (Reimer and Matthes 2007: p. 714). Individuals idealise or adjust life histories in order to meet the typical or desired order of events; this can result in omitting or distorting episodes (Conway and Pleydell-Pearce 2000). Research calls this 'smoothing over one's life course' (Reimer and Matthes 2007: p. 718). For these reasons, we suggest that individuals may leave out short episodes of employment, sometimes do not report minor changes like promotions, or omit distressing or unpleasant time periods. Because we assume that this strategy is used by all individuals in a similar way, hierarchical, parallel, and sequential pathways can nevertheless be used to stimulate human recall without biasing the final results.

4.4 Stimulation of autobiographical memory: Combining modularised self-reports and event history calendars

Reflecting these findings, in an effective interview human memory should be allowed to proceed as naturally as possible by making use of the above explained structure. Thus, interviewing techniques should contextualise recall and encourage the usage of several retrieval strategies (Reimer and Matthes 2007). The approach implemented in the IAB-ALWA study combines modularised self-reports and event history calendars in order to optimise the use of several retrieval strategies but emphasise them differently at certain stages of the interview. A further aim was to

maintain a high level of standardisation which is necessary in a large-scale survey. Modularised self-reports are used to collect initial data, while a simplified event history calendar is used for revision of temporal inconsistencies.

4.4.1 Modularised self–reports as tool for data collection

Barsalou (1988) suggests that the entire life history should not be reconstructed by using one single time-line, but instead, different types of episodes should be assessed on various extended-episode time-lines. Thus, we organise an individual's life course history into several thematic domains, such as schooling, employment or partnership. This is what we call *modularization. Modularization* reflects the finding that personal events are closely linked to the context in which they take place. Therefore, they can be split up into chapters representing those contexts (Tourangeau, Rips and Rasinski 2000: p. 70), an idea which has already been used in several waves of the German Life History Study (GLHS) (cf. Hillmert et al. 2004). Within each module, the interviewer assesses episodes that have been spent in a certain state (e.g. attending the same type of school) in chronological order, taking advantage of the fact that episodes of the same type are often contiguous. So, *sequencing* as a chronological order strategy is used additionally to collect information. We begin with the earliest episode of a particular type and proceed in chronological order. This approach is in line with experimental research that showed that respondents tend to report long foregone episodes first (Glasner and van der Vaart 2008). It also reflects experiences from other large-scale European surveys that use a similar design as, for example, the English Longitudinal Study of Ageing (ELSA) (Hacker et al. 2007) or the retrospective part of the Survey of Health, Ageing and Retirement in Europe (SHARELIFE) (Schröder and Börsch-Supan 2008). However, these studies standardise their instruments only to a limited extent and often entrust the respondent with the decision about which specific episodes to remember.

In the IAB-ALWA study we gather detailed information about specific events within extended-episode time-lines. The recall process is embedded in a hierarchical structure with a thematic domain as superordinate extended episode type. In this way, we attempt to collect temporal information on the dating of episodes on the one hand, and information that specifies the event on the other hand, in a standardised framework. Essentially, this means that every respondent moves through his/her life several times during the interview. By giving the option to report more than one type per time unit, this approach avoids the possibility that parallel or overlapping sequences may be left out. Thus, it should prevent respondents from 'smoothing over' their life courses. Moreover, it accounts for the fact that individuals can be involved in two types of events in different domains

at the same time, for example they can study and work part-time simultaneously. Hence, *parallel retrieval* is encouraged by this design.

Within some of the more complex life domains such as employment or vocational education, *top-down retrieval* (Conway 1996) is additionally stimulated. By starting with the most frequent and salient episodes (e.g. main employment episodes) an alternative question wording within the modules stimulates less frequent or less salient episodes (e.g. secondary jobs or marginal employment). Thereafter, the interviewer asks for more specific episode types such as internships, traineeships, vicariates, job creation schemes and other fixed-term types of employment. In principle, however, it is left to the respondent to decide in which sub-module he/she reports the episode as long as he/she remains in the same domain. Each of these sub-modules leads to a type-specific sequence of questions that is very similar for all sequences. Additional information given in previous parts of the interview, such as answers naming the job title of the last period of employment is used to stimulate the respondent's memory. This strategy is called *dependent interviewing* (Jäckle and Lynn 2007).

However, there are several problems linked to using modularised self-reports on extended-episode time-lines. First, memory outside a specific domain is not stimulated, limiting the efficacy of *parallel recall processes* described above. More specifically, this indicates that the sequential retrieval of episodes not on the same extended-episode time-line is restricted or even inhibited. Only *sequential* or *parallel pathways* within one domain are made accessible. Hence, completeness and consistency across domains cannot be guaranteed by *modularised reports*, because the overarching biographical context is blanked out. Time periods either filled with no information (gaps) or with inconsistent information existing across domains will not be visible at first glance, neither to the interviewer nor to the respondent. To overcome this problem, we included the possibility for *parallel retrieval* by giving the interviewers the chance to re-access answers that had been previously given. *Parallel retrieval* is, however, difficult to standardise, because the underlying processes are very individual. Therefore, we are unsure whether this strategy was successful or whether it will produce the desired effect. Second, because episodes are not usually time-tagged, the dating of episodes has to be reconstructed by the interviewer, often instantaneously during the interview process. The dating of episodes is therefore regarded as especially error prone. To overcome these problems, an event history calendar is used, serving not only as a recall aid but also as a second stage in the data collection process.

4.4.2 Event history calendar as recall aid

Traditionally, event history calendars assist in the collection of information about episodes and their dating on a grid with the horizontal axis as the time-line and the vertical axis split up into several life domains (Freedman et al. 1988). An event history calendar contains two features: it covers limited but specific and important life domains and it utilises a flexible interviewing style to stimulate memory retrieval. Belli (1998) first linked insights from cognitive psychology with the rationale of constructing event history calendars (EHC) and used them for data collection. He considers it a powerful tool with which to collect life histories, because it constitutes a reference point for both the interviewer and respondent in order to cover important life domains and connect them with each other. However, scant attention has been paid to confirming this notion empirically. Van der Vaart (2004) found that event history calendars are an effective tool for the collection of long foregone, unimportant, and less frequent episodes, but the usage of event history calendars in large-scale surveys that are administered by computer-assisted telephone interviews is associated with several shortcomings. One drawback is that they cannot realistically be used as standardised instruments in telephone surveys, because the event history calendar is not visible to the respondent. Thus, implementing an event history calendar also requires experienced and skilled interviewers.

Due to these shortcomings, event history calendars are not utilzed in the first stage of the data collection tool implemented in our study. However, in accordance with suggestions from previous research, they are used as a recall aid and a data revision module in the second stage of data collection (Glasner and van der Vaart 2009). All episodes that are collected throughout the interview are merged and displayed together on a list, abandoning the structure of several separate time-lines, an idea which has been developed and tested by Matthes, Reimer and Künster (2005). Memory cues in the form of specific survey questions and contextual information become available to stimulate the respondents' retrospective memory, but inconsistencies can only be resolved when they are visible to the interviewer (Freedman et al. 1988). Therefore, algorithms are programmed to detect whether there are any temporal gaps, overlaps or parallel episodes that are not considered possible by the survey designers. In particular, gaps can occur because temporal information was only collected for a limited number of life domains. Also, previously concealed gaps and inconsistencies that exist across domains become apparent in the data revision module. These gaps and inconsistencies can be viewed as a sign of potential recall problems and are communicated and resolved in collaboration with the respondent. Hence, *parallel recall* is stimulated in the event history calendar where all chronological information is used simultaneously.

As a further step, data on these gaps and inconsistencies is collected by giving information about temporal connections (i.e. episodes directly located before or after the inconsistency) to the respondent. In order to close these gaps the questionnaire leads back to the modularised self-reports and the adequate episode. Data on other missing episodes that could not be reported previously is directly collected in the data revision module, for example information on longer periods of holiday or time spent as a homemaker without being on parental leave. For overlapping or parallel episodes the inconsistency can either be confirmed by the respondents or the start and/or end dates of episodes can be adjusted until they adjoin each other. This accounts for the finding that episodes are often not time-tagged, and both start and end dates are more effectively remembered in conjunction with other episodes.

The chronological order of imputing gaps and resolving inconsistencies is not to the sole responsibility of the interviewer. Rather, the problem solving procedure is embedded in a pre-defined routine diminishing the interviewers' cognitive effort and equalizing differences in interview skills. To ensure standardised reporting of gaps and inconsistencies, scripted questions, prescribing exact question wordings, guide the interviewer and respondent through the interview process (Reimer and Matthes 2007). A narrative style of interviewing is not possible in such a large scale survey design but the scripted questions were pre-formulated to sound as naturally as possible. Moreover, *dependent interviewing* strategies adapting the wording of the questions to the previous answers of the respondents were implemented. Interviewers were encouraged to give additional information when something was unclear and to use probing strategies such as *landmark events* to stimulate memory. However, we only included personal landmarks (e.g. moving dates) in our tool because public landmarks (e.g. 9/11) were found to be of only minor importance (Hacker et al. 2007; van der Vaart and Glasner 2010). The data revision module is recursive, meaning that all changes except for open text comments are implemented instantaneously. This method can result in new gaps and overlaps that have to be resolved. We expect that this procedure will not lead to more gaps or inconsistencies.[25]

In summary, the hybrid modularised self-report/event history calendar design adopts advantages gained by insights from cognitive psychology, because it uses available idiosyncratic structures in the autobiographical memory of a respondent. The given chronological order and parallel retrieval is not used in the first stage but emphasised in the data revision module in the second stage. In the next paragraph, we will assess empirically who benefits from this module and investigate whether the data revision module really improves completeness and dating accuracy in our study.

25 The technical implementation of the data revision module is described in the appendix.

4.5 Data, measurement, and empirical methods

The data revision module was implemented in the IAB-ALWA study which collected life history data of 10,177 respondents belonging to birth cohorts from 1956 to 1988. The data collection was accomplished with CATI techniques and is based on methods developed for the German Life History Study (GLHS) conducted at the Max Planck-Institute for Human Development in Berlin in the 1990s and early 2000s (Antoni et al. 2010, 2011; Kleinert, Matthes and Jacob 2008). Excluding gaps, 98,149 episodes were collected in the following life domains: schooling, vocational education, employment, unemployment, military service (including civil service and voluntary social service) and parental leave. In addition, the residential history of respondents was assessed. Other episode types could be added in the data revision module as different types of gap episodes. The number of gap episodes amounted to 9,339. These episodes could be, for example longer periods of holiday, time spent as a homemaker, sickness leave or other unspecified time periods.

Insights from cognitive psychology and experimental research on recall (e.g. Glasner and van der Vaart 2008; Huttenlocher, Hedges and Bradburn 1990; Matthes, Reimer and Künster 2007) reveal that autobiographical memory works differently with respect to the collection of information about episodes and their dating. Therefore, we base our empirical analyses on two dependent variables indicating a change made in the data revision module. In doing so, we claim to interpret the differences between data before and after the data revision module as corrected errors. In our data it is possible to differentiate between added episodes that refer to completeness and changed episodes that refer to dating accuracy. Thus, the first dependent variable measures added episodes that have been omitted in the modularised questionnaire but were reported in the data revision module. It was possible to add episode types that had been forgotten in the modularised questionnaire, which amounted to 3,996 episodes. This also means that we do not take the gap episodes into consideration because they could not previously be reported in the modularised questionnaire. In total, we arrive at a 12.4 per cent increase in episodes (3.7 per cent added episodes; 8.7 per cent gap episodes) compared to the data gathered before the data revision module, indicating an overall improvement in completeness.

The second dependent variable refers to dating corrections in episodes. It was possible to modify all episode types with respect to the beginning and end of the episode (month and year reported). We applied a restrictive measure of changed episodes and excluded all date corrections implemented in the programming routine of the data revision module, such as seasonal date corrections. Seasonal date corrections are estimates that were used when respondents could not remember

the exact month in which the event took place, but were able to remember the season. The reason for exclusion is that the distinction between date corrections induced by the respondent and those generated by the program itself is not always clear cut. Altogether, 4.4 per cent of the episodes were corrected. More precisely, in 1.9 per cent of the episodes the starting month was corrected, in 2.6 per cent the final month was corrected, in 1.7 per cent it was the starting year and in 1.9 per cent the final year. Often more than one component of the date was corrected.[26] The structure of these episodes can be obtained from Table 4.1.

Table 4.1: Summary statistics first and second stage of data collection by episode type

	First stage: episodes collected (N)	Second stage: episodes added (N)	Increase in episodes (in per cent)	Second stage: episodes corrected (N)
Schooling	24,270	330	1.35	827
Vocational training	19,302	529	2.74	1,076
Employment	33,667	1,949	5.79	1,926
Unemployment	9,410	1,128	11.99	529
Military service	3,509	60	1.71	212
Parental leave	4,967			111
Vocational preparation schemes	3,024			85
Gap episode		9,339		131
Total excluding gaps		3,996		4,766
Total including gaps		13,335		

In total 98,149 (excluding gaps) or 107,488 (including gaps) episodes were collected.

Independent variables are individual, as well as event specific, characteristics. On the individual level we include a dichotomous variable indicating the gender of the respondent, a variable denoting the age, centered on the mean, and the highest educational degree of the respondent at the moment the interview took place. Education was coded as a series of dummy variables representing different levels of the ISCED-97 classification (International Standard Classification of Education 1997) (OECD 1999). To measure event specific characteristics, we use a further set of dummy variables indicating the event type. We distinguish between schooling, vocational training, employment and unemployment. In addition, we included the duration of the episode in months, centered on the mean, the time-lag between the episode's end and the interview date in months, standardised by the mean age

26 Results are provided upon request.

of the respondents, and the total number of episodes a respondent reported before he or she entered the data revision module. Summary statistics of these measures can be obtained from Table 4.2.

Table 4.2: Summary statistics of the independent variables

Variable	Observations	Mean/ (categorical variables in %)	Std. dev.	Min	Max
Female	107,488	0.51			
Age	107,488	39.12	9.16	19	52
Highest educational degree	107,395				
Primary and lower secondary education (ISCED 1 + 2)	7,093	6.60			
Upper secondary education (ISCED 3A + 3B)	45,253	42.14			
Post-secondary non tertiary education (ISCED 4A)	13,997	13.03			
First stage of tertiary education (vocational) (ISCED 5B)	14,643	13.63			
First stage of tertiary education (academic) and second stage of tertiary education (ISCED 5A + 6)	26,409	24.59			
Number of Episodes	107,488	9.74	4.03	1	36
Duration	106,880	38.96	47.89	0	462
Time-Lag (in Monts)	106,953	171.90	129.64	0	527

Descriptive results reveal that there are a number of factors influencing the likelihood of adding or correcting episodes.[27] To account for this, we conducted multivariate analyses using both the likelihood of adding and the likelihood of correcting an episode as dependent variables. Thus, the dependent variables are dichotomous variables with a value of 1 indicating a change induced by the data revision module and a value of 0 indicating no change with respect to the data revision module.

The dependent variables are examined in separate logistic regressions taking the nested structure of the date into account, which means that one respondent can deliver several episodes. We calculate robust standard errors to account for these clusters (Huber 1964). In our models only around 4,000 events

27 Figures are provided upon request.

for the logistic regression on the likelihood of adding an event and around 5,000 events for the likelihood of correcting an event can be analysed. We thus consider the rare event structure of the data with a small number of events but a multitude of non-events (almost 100,000). As suggested by King and Zeng (2001), we calculate logit models for rare events data. They make use of the statistical finding that in the case of a rare event structure, the event itself is more statistically informative than a non-event. Technically this means that consistent ML-(Maximum likelihood) estimators are calculated that give a lower mean square error for a coefficient in the presence of rare event data.[28] Because previous research indicated that gender differences are especially pronounced in autobiographical memory (Auriat 1991; Matthes, Reimer and Künster 2007; Paull 2002), we decided to include separate models for men and women. A chow test also confirmed that the coefficients jointly vary between men and women.[29] Furthermore, we examine separate models for different types of episodes, because it can be assumed that they are remembered and retrieved not in the same manner. The following paragraph presents several descriptive as well as multivariate results on the completeness and dating accuracy in the IAB-ALWA study.

4.6 Completeness and dating accuracy in ALWA

4.6.1 Completeness: Added episodes

4.6.1.1 Descriptive results

In this paragraph we examine which episodes have a high likelihood of being omitted in the modularised questionnaire and being added in the data revision module. Furthermore, we focus on the most important episode types and exclude parental leave and vocational preparations schemes from the analyses. We also focus on differences between episode types because research found that there are variations in recall depending on the type of episode (Reimer and Matthes 2007).

Depending on the type, Figure 4.1 depicts the absolute probability of an episode being added, which is in line with previous research results (Matthes, Reimer and Künster 2007). Almost half of the episodes are employment episodes, but unemployment episodes are also frequently added. In total, over two thirds of the

28 Details can be found in Tomz, King and Zeng (2003), King and Zeng (2001), and King and Zeng (2002). The ReLogit Stata ado file can be downloaded from http://www.jstatsoft.org/v08/i02. Note that model fit statistics, e.g. Pseudo-R^2 cannot be calculated. Regression diagnostics and model fit statistics to check for specification errors and to get an impression of model quality were calculated using standard logistic regression models.

29 Results are provided upon request.

episodes are either employment or unemployment episodes. The other episodes, such as school, vocational training and military service, are less likely to be forgotten. This result is not surprising, because unemployment and employment episodes are expected to occur more often than vocational training, schooling or military service.

Figure 4.1: Added episodes by type

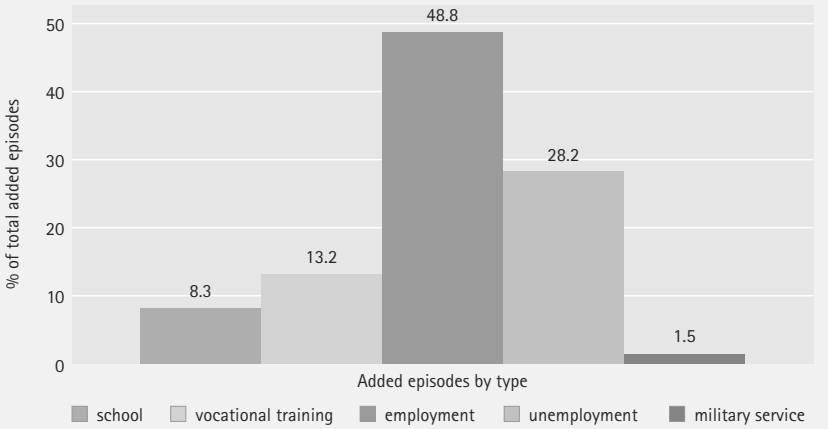
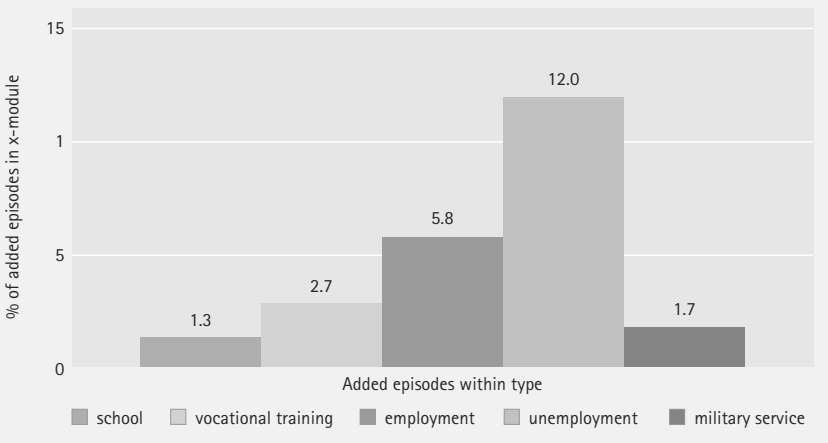


Figure 4.2: Added episodes within type



In our view, however, it is also interesting to change the focus to the analysis of added episodes within the episode type. Figure 4.2 reflects the relative probability of an episode being added. It becomes clear that unemployment episodes have by far the largest relative probability of being omitted in the modularised questionnaire and being added later on. In total, 12 per cent of the unemployment episodes were added in the data revision module. This indicates

that unemployment episodes are especially error prone. For employment episodes, the relative probability of making additions is also quite large, at approximately six per cent, although it amounts to only half of the likelihood of unemployment episodes. For the other types of episodes, the relative probabilities are a lot smaller and range between 1.3 and 2.7 per cent. This indicates that the data revision module seems to be more important for episode types that occur more often, are less bound to institutions, or are less salient to the respondent. Revising data seems to have the highest importance for the collection of unemployment histories, because they are considerably more complete now than they would be without making use of the data revision module.

4.6.1.2 Influencing factors on adding episodes

To account for the fact that different influence factors work simultaneously, we conducted multivariate analyses on the likelihood of adding an episode.[30] First, we estimate a model including both men and women. Women have a 19 per cent lower likelihood compared to men of making an addition. As can be seen from Table 4.3, women are less likely to make additions. Age also has an influence on episodes. Every additional year above the mean age of 39 increases the likelihood of adding an episode. Obviously, for individuals nearing the end of their 30s, it becomes increasingly challenging to remember their complete life history, and this effect is again highly significant. In contrast, the level of education does not matter. There is almost no evidence that less-educated people are more likely to omit episodes, except for men with a low level of education.

Turning to the characteristics of the type of episode, we find that, compared to employment episodes, all other types of episodes, except for those reporting on unemployment, were added with a significantly lower likelihood. This finding means that employment as well as unemployment episodes are especially error prone and confirms our descriptive results. Furthermore, characteristics of the episode itself are important in relation to the probability of firstly omitting the episode and subsequently adding it on. Each additional month of duration, starting from the mean duration of around three years, decreases the likelihood of adding an episode later on. This indicates that longer episodes are less likely to be omitted. The likelihood of adding an episode decreases with every additional observation above the average number of episodes (around 10 episodes). The time-lag that exists between the start date of the episode and the interview date has a positive impact on adding episodes. Thus, the more time that has elapsed between the

30 Corresponding univariate analyses can be provided upon request.

episode and the interview date, the more likely it is that the episode will be initially omitted and subsequently added in the data revision module. In conclusion, all variables relating to the characteristics of the episode are highly significant.

Table 4.3: Logit models for rare event data, full model and models for men and women, added episodes as dependent variable

	Model 1 Full Coeff. (Robust SE)	Model 2 Men Coeff. (Robust SE)	Model 3 Women Coeff. (Robust SE)
Female	-0.196***		
	(0.043)		
Age	0.018***	0.014***	0.025***
	(0.003)	(0.004)	(0.004)
Highest educational degree (ref. ISCED 5A + 6)			
ISCED 1 + 2	0.252**	0.491***	-0.014
	(0.088)	(0.096)	(0.103)
ISCED 3A + 3B	-0.133*	-0.041	-0.229***
	(0.054)	(0.061)	(0.062)
ISCED 4A	-0.036	0.100	-0.171*
	(0.069)	(0.085)	(0.080)
ISCED 5B	-0.093	-0.114	-0.039
	(0.072)	(0.076)	(0.090)
Type of episode (ref. employment)			
Schooling	-1.558***	-1.913***	-1.167***
	(0.097)	(0.106)	(0.104)
Vocational education	-1.120***	-1.328***	-0.863***
	(0.060)	(0.072)	(0.074)
Unemployment	0.350***	0.347***	0.349***
	(0.052)	(0.059)	(0.061)
Military service	-1.887***	-2.011***	-1.035*
	(0.155)	(0.144)	(0.419)
Duration	-0.020***	-0.016***	-0.026***
	(0.001)	(0.001)	(0.001)
Number of Episodes	-0.111***	-0.100***	-0.128***
	(0.009)	(0.007)	(0.008)
Time-Lag (in months)	0.640***	1.094***	0.172
	(0.137)	(0.155)	(0.149)
Constant	-2.879***	-2.950***	-3.050***
	(0.060)	(0.064)	(0.067)
Observations (episodes)	89,169	47,074	42,095

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The separate models for men and women reveal similar effects as the model including both men and women. Only small differences caused by the level of education and military service episodes are reflected. Again, a positive age effect for men and women, and almost no effect of the level of education is found. The influence of the episode type also resembles that of the full model. Once more, a negative duration effect and a negative effect of the number of episodes are reported. One striking difference, however, has to be mentioned: the time-lag between the interview date and the end of the episode has a positive and highly significant effect for men but not for women. For women it does not matter how much time has elapsed since the event started but for men this time-lag is highly significant.

We also modelled each of the episode types separately (Table 4.4). Concerning individual characteristics, a negative effect for females can only be found for employment episodes. Thus, gender does not equally affect omitting or adding an episode for all types of episodes. A positive age effect can only be obtained in the models for schooling, employment and unemployment episodes. An impact of the level of education is noted for vocational training episodes, and to a lesser extent in unemployment histories. For vocational training episodes less-educated individuals have a significantly lower likelihood to omit and add an episode in the data revision module. One possible interpretation is that less-educated persons have less complex educational histories to remember. For military service, no significant impact can be found for the variables included in the model. The effects related to characteristics of the event itself are quite similar for the duration and the number of episodes previously reported. However, the negative effect of the time-lag between the end of an episode and the interview date, in the case of schooling events is reversed compared to the full model. This indicates that this type of episode is remembered differently.

Table 4.4: Logit models for rare event data, separate models for different types of episodes, added events as dependent variable

	Model 1 Schooling Coeff. (Robust SE)	Model 2 Vocational Coeff. (Robust SE)	Model 3 Employment Coeff. (Robust SE)	Model 4 Unemployment Coeff. (Robust SE)	Model 5 Military Coeff. (Robust SE)
Female	0.023	0.195	-0.401***	-0.117	0.846
	(0.123)	(0.108)	(0.059)	(0.082)	(0.437)
Age	0.095***	-0.014	0.014**	0.015**	-0.011
	(0.009)	(0.009)	(0.005)	(0.006)	(0.034)
Highest educational degree (ref. ISCED 5A + 6)					
ISCED 1 + 2	-0.087	-0.628*	-0.182	0.788***	0.200
	(0.275)	(0.244)	(0.186)	(0.146)	(0.777)
ISCED 3A + 3B	-0.231	-0.957***	-0.276***	0.316**	-0.278
	(0.188)	(0.136)	(0.074)	(0.109)	(0.362)
ISCED 4A	-0.338*	-0.442***	-0.172	0.246	0.339
	(0.212)	(0.155)	(0.097)	(0.139)	(0.443)
ISCED 5B	-0.500	-0.886***	-0.018	0.073	0.397
	(0.261)	(0.162)	(0.097)	(0.157)	(0.480)
Duration	-0.040***	-0.047***	-0.016***	-0.010***	-0.008
	(0.003)	(0.004)	(0.001)	(0.002)	(0.007)
Number of Episodes	-0.139***	-0.091***	-0.195***	-0.021*	-0.050
	(0.036)	(0.019)	(0.017)	(0.010)	(0.048)
Time-Lag (in months)	-5.411***	1.389***	1.861***	0.895***	0.181
	(0.337)	(0.376)	(0.198)	(0.255)	(1.904)
Constant	-1.164***	-4.408***	-2.995***	-2.699***	-4.320***
	(0.248)	(0.215)	(0.072)	(0.121)	(0.885)
Observations (episodes)	24,082	18,917	33,439	9,248	3,483

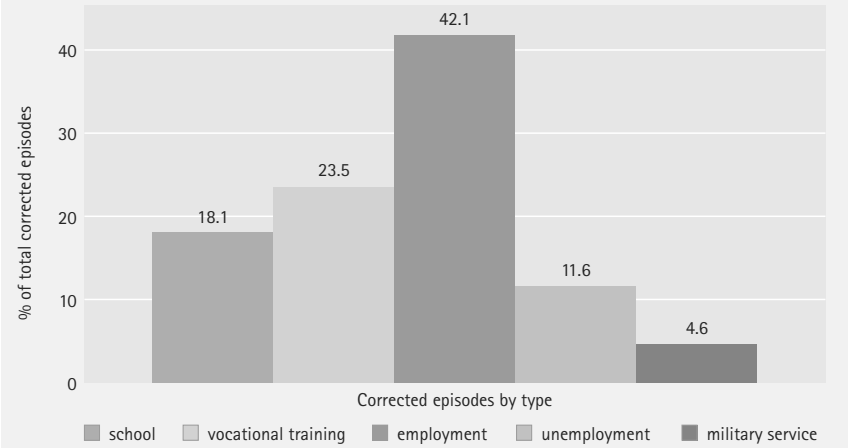
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.6.2 Dating accuracy: Corrected episodes

4.6.2.1 Descriptive results

In this section we examine the likelihood of episodes being revised in the data revision module in terms of dating corrections. In doing so, additional episodes are included in the models, because all episodes could be changed with respect to the starting and/or finishing date (month and year). Thus, corrected episodes serve as a proxy for dating accuracy. For the results we decided to focus again on the most important episode types. In some respects, the results resemble those presented earlier in the results section for added episodes. First, the absolute probability of an episode being corrected is reported, and this probability is displayed in Figure 4.3.

Figure 4.3: Corrected episodes by type

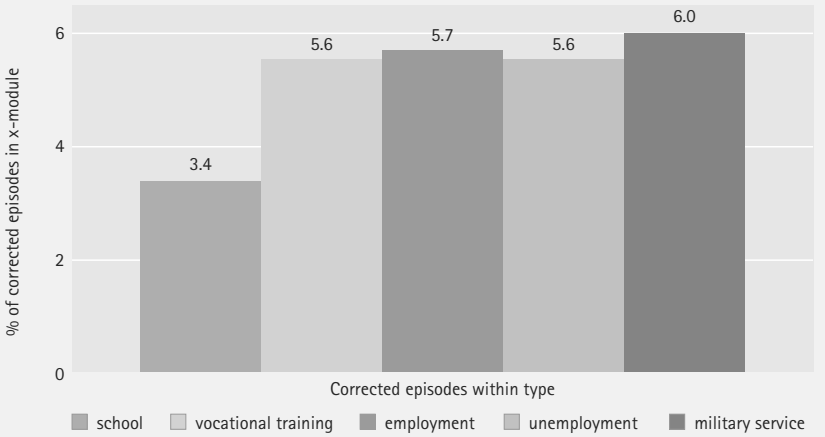


42 per cent of the corrected episodes are employment episodes, which is by far the greatest number across all episode types. However, school and vocational training episodes are also corrected frequently. Bearing in mind that these episodes are usually concentrated in the early life course of an individual, this result is not surprising. Fewer corrections occur in unemployment episodes and also in the dating of military or civil service.

Figure 4.4 displays the relative probability of an episode being corrected. When examining corrected episodes within the type, it becomes clear that corrections in the dating are obviously not bound to the episode type. The percentage of corrections is quite similar across types. Around 6 per cent of the episodes of one type are corrected. The only exception is schooling, where the percentage appears to be lower compared to the other types, because only episodes ending after the

respondent's 14th birthday were included in the data revision procedure. However, these findings already indicate that adding and correcting episodes are driven by different mechanisms.

Figure 4.4: Corrected episodes within type



4.6.2.2 Influencing factors on correcting episodes

For corrected measures a different picture emerges to that for added episodes (Table 4.5): out of the individual characteristics, a significant negative effect is only reported for gender. Female respondents are less likely to make a dating correction. In contrast to the results of adding an episode, neither an age nor an education effect is found. Individual characteristics are obviously not relevant for correcting episodes but only for adding episodes. Turning to the effects of the characteristics of the episode, vocational training, unemployment, and military service episodes are more likely to be corrected with respect to the dating compared to employment episodes. This result contradicts the one of added episodes. However, compared to employment episodes, those of schooling are less likely to be corrected. This is not surprising, because schooling episodes are only checked from the 14th birthday of a respondent. Furthermore, they are located in the early life course of an individual and are non-recurrent unique events. In contrast, employment episodes take place over a longer time span in the life course of an individual. There is a highly significant, small, and positive effect of the episode's duration and a positive effect caused by the time-lag. The last result is not surprising: the more time that has elapsed since the episode took place, the more likely it is to be corrected. The first result is somewhat surprising. The longer an episode, starting from the average

duration of around three years, the more likely it is that it will be corrected. A possible explanation could be that for long episodes it becomes more difficult to determine the exact dating with respect to month and year.

Table 4.5: Logit models for rare event data, full model and modes for men and women, corrected episodes as dependent variable

	Model 1 Full Coeff. (Robust SE)	Model 2 Men Coeff. (Robust SE)	Model 3 Women Coeff. (Robust SE)
Female	-0.105**		
	(0.039)		
Age	-0.003	-0.008	0.000
	(0.003)	(0.004)	(0.004)
Highest educational degree (ref. ISCED 5A + 6)			
ISCED 1 + 2	0.024	0.057	0.006
	(0.089)	(0.125)	(0.128)
ISCED 3A + 3B	0.055	0.051	0.065
	(0.049)	(0.069)	(0.071)
ISCED 4A	0.106	0.042	0.157
	(0.064)	(0.097)	(0.088)
ISCED 5B	0.109	0.105	0.114
	(0.059)	(0.075)	(0.098)
Type of episode (ref. employment)			
Schooling	-0.611***	-0.817***	-0.395***
	(0.063)	(0.089)	(0.089)
Vocational education	0.262***	0.121*	0.424***
	(0.040)	(0.054)	(0.057)
Unemployment	0.430***	0.334***	0.514***
	(0.053)	(0.076)	(0.074)
Military service	0.320***	0.228**	0.369
	(0.076)	(0.079)	(0.365)
Duration	0.005***	0.005***	0.005***
	(0.000)	(0.000)	(0.000)
Number of Episodes	0.004	0.004	0.004
	(0.005)	(0.007)	(0.008)
Time-Lag	0.881***	1.191***	0.543***
	(0.106)	(0.154)	(0.147)
Constant	-3.364***	-3.379***	-3.448***
	(0.051)	(0.067)	(0.068)
Observations (episodes)	106,471	52,396	54,075

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Examining men and women separately, it appears that individual characteristics do not matter at all. There is no significant effect of either age or level of education. Episode characteristics, however, are significant for both men and women. Vocational training episodes have a higher likelihood of being corrected only by women, while military service, including civil service and voluntary social service episodes, is more likely to be corrected by men only. The last result is not unexpected because most of the military service episodes in Germany relate to men.[31] The positive duration effect is not gender-specific, a finding contradictory to the model for added episodes with respect to the direction and lack of gender difference. There is no effect of the number of episodes reported in any of the models reflecting the finding that data corrections are not bound to the frequency of reported events.

Assessing the influence of different characteristics for different types of episodes separately, one receives ambiguous findings concerning individual characteristics (Table 4.6). No gender effect can be obtained for corrections. The age effect is obviously different for different types of episodes, leaving a positive age effect of schooling episodes and a negative effect for vocational training, employment and unemployment episodes. A highly significant positive effect of holding a lower secondary degree or having reached the first stage of tertiary education in the academic field can only be found for employment episodes. With regard to the duration, the results are quite similar for almost all types of episodes with a positive effect, except for military service episodes, where a negative effect can be found. Except for unemployment, no effect of the number of episodes that are reported can be found. Again, the positive effect of the time-lag between episode and interview date for all other of episodes except for military service episodes is reversed and negative for schooling episodes.

31 Germany introduced compulsory military service for men but not for women. However, it is possible for women to take a social, ecological or European year as a voluntary service. These episodes are also included in the military service episodes because they, and the civilian service, can also serve as a replacement for compulsory military service.

Table 4.6: Logit models for rare event data, separate models for different types of episodes, corrected events as dependent variable

	Model 1 Schooling Coeff. (Robust SE)	Model 2 Vocational Coeff. (Robust SE)	Model 3 Employment Coeff. (Robust SE)	Model 4 Unemployment Coeff. (Robust SE)	Model 5 Military Coeff. (Robust SE)
Female	0.031	-0.021	-0.089	-0.085	-0.846
	(0.083)	(0.069)	(0.055)	(0.098)	(0.437)
Age	0.074***	-0.021***	-0.020***	-0.011	0.011
	(0.006)	(0.006)	(0.004)	(0.007)	(0.034)
Highest educational degree (ref. ISCED 5A + 6)					
ISCED 1 + 2	0.030	-0.137	0.204	-0.247	0.200
	(0.181)	(0.213)	(0.140)	(0.203)	(0.777)
ISCED 3A + 3B	0.135	-0.117	0.265***	-0.231	-0.278
	(0.115)	(0.090)	(0.072)	(0.126)	(0.362)
ISCED 4A	-0.015	-0.009	0.259	0.002	0.339
	(0.141)	(0.115)	(0.093)	(0.158)	(0.443)
ISCED 5B	0.266*	-0.167	0.390***	-0.057	0.397
	(0.135)	(0.107)	(0.086)	(0.172)	(0.480)
Duration	0.004***	0.015***	0.005***	0.007***	-0.008
	(0.001)	(0.001)	(0.000)	(0.001)	(0.007)
Number of Episodes	0.013	0.000	0.005	-0.032**	-0.050
	(0.013)	(0.010)	(0.007)	(0.012)	(0.048)
Time-Lag	-4.253***	2.054***	2.467***	1.118***	0.181
	(0.229)	(0.269)	(0.166)	(0.310)	(1.904)
Constant	-1.156***	-3.361***	-3.639***	-2.720***	-4.320***
	(0.160)	(0.106)	(0.074)	(0.128)	(0.885)
Observations (episodes)	24,082	19,105	33,439	9,248	3,483

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.7 Discussion of the major findings

First, we analyzed which episodes have a greater likelihood of being forgotten in the modularised collection of data, but can be retrieved in a different setting in the data revision module. In summary, for the probability of adding an episode, both individual (gender, age and education) and event specific characteristics (type, number of episodes, time-lag and duration) are significant. However, the analyses showed that event specific characteristics are more important. Overall,

the variables taken into consideration in the models seem highly relevant. Gender differences are especially pronounced, indicating that women tend to forget fewer episodes. The results can be interpreted in two ways: first, women initially tend to forget fewer episodes including those that occurred a long time agomeaning that they have less to add later on. Second, it is possible that women benefit less from the data revision module. We are confident that the first option is more likely because it would resemble previous research on gender differences (Auriat 1991).

Separate models for men and women reveal that the time-lag between the interview date and the end of the episode matters only for men but not for women. For women, in contrast to men, it does not matter how much time has elapsed since the event took place in order for them to remember the event. This is in accord with previous experimental research conducted by several authors (Auriat 1991; Paull 2002; Reimer and Matthes 2007). Separate models for different types of episodes reveal that especially individual characteristics have diverse influences on different event settings. These findings can at least partly be substantiated by the fact that different types of episodes, like schooling episodes, occur earlier in the life course of an individual. Furthermore, different people could inconsistently be affected by those events, e.g. military service is in most cases taken by men because it is compulsory for them. For schooling episodes we found a result which is rather surprising: the longer the time-lag to the interview date, the less likely it is that the episode will be remembered not until the data revision module. Bearing in mind that schooling episodes take place chronologically early in life and can also be viewed as unique events which are usually remembered well, it becomes clear that schooling episodes, no matter how much time has elapsed, are not likely to be forgotten.

Second, we examined which episode types are more error prone in terms of dating accuracy. A different picture emerges here than for adding an episode. Event specific characteristics are again more important than individual characteristics. It is not surprising that the number of observations is insignificant, because our model refers to dating accuracy and this should intuitively have nothing to do with the number of episodes previously remembered. Furthermore, it indicates that episodes are indeed not time-tagged (Glasner and van der Vaart 2008). When assessing separate models for different types of episodes it becomes clear that especially individual characteristics age are of varying importance for different type of episodes. The dating of schooling episodes is more likely to be corrected with increasing age, which can again be explained by the peculiarities of schooling episodes – their uniqueness and their chronological positioning especially for people in their 40ties. Vocational training and employment episodes are in turn

less likely to be corrected by older people. In sum, for dating accuracy it can be assumed that there are more relevant characteristics besides those examined in this chapter. Other memory features are probably important but those are generally difficult to trace.

4.8 Conclusion

An important contribution of this study was to conduct multivariate analyses on the effectiveness of the data revision module. This strategy seems necessary when bearing in mind that omitting episodes or dating them wrongly is, as suggested by cognitive psychology, a multifaceted concept. Furthermore, this chapter brings together theoretical notions from cognitive psychology with the design of standardised, large-scale surveys. We followed several guidelines on how to stimulate human recall with an appropriate survey design given by, for example, Groves et al. (2009) or Tourangeau (2000). Among other implications, they suggest using life event calendars, multiple cues, and longer or decomposition techniques. Overall, the data revision module that was incorporated as a recall aid in the IAB-ALWA survey improves the completeness of the data and dating accuracy. Individual and event specific characteristics matter in relation to adding an episode. This picture is different in the case of correcting an episode, where only event specific characteristics are crucial.

A special emphasis has to be put on the results regarding the recall of one particular type of episode: unemployment episodes are obviously especially error prone when assessing them in a standardised interview setting, such as modularised self-reports. This is in line with the previous experimental research results of Paull (2002, 1997), Belli et al. (2007), and Dex and McCulloch (1998). In summary, we conclude that unemployment episodes have probably been underestimated in previous life course studies. From a psychological point of view, unemployment carries a 'social stigma' (Reimer 2004) and stable periods of unemployment are rarely found, because unemployed people are usually constantly looking for work. In our view, periods of unemployment can indeed be seen as non-events (Elias 1997) where recall is only very loosely bound to pathways that can be stimulated because nothing special happens or particular characteristics cannot be remembered. The data revision module, however, stimulates the recall of unemployment episodes and is therefore especially useful for this type of episode.

Regarding the practicability of the data revision module, we can confirm that including such a module in a large scale survey design is feasible. It obviously facilitates the respondents' memory retrieval. Clearly, the freedom of the interviewers has to be limited in favour of a standardised interview, which is in

sharp contrast to the original idea of the event history calendar method (Belli 1998; Freedman et al. 1988). One advantage is, however, that interviewers can be trained within a short period of time to use the tool, because interview training is not as intensive as that for using standard EHC (Glasner and van der Vaart 2009). Once interviewers are familiar with retrospective interviewing techniques and probing strategies to facilitate retrieval, the data revision module is easy to handle. Furthermore, it levels out the difficulty that interviewing skills are unevenly distributed and makes data as complete and consistent as possible before they are edited without the assistance of the respondent.

The data revision module is only an intermediate step. Further editing is still necessary because one problem of human memory, the misclassification of events, is not addressed at all by the data revision module (Reimer 2004). These kinds of errors occur because respondents report episodes in the wrong module and it becomes necessary to shift episodes from one module to another while preserving as much information as possible. Theoretically, it would be possible to include this step in the data revision module, but we think that these errors are hard to detect during the interview process and doing so would overstrain the interviewer as well as the respondent. Thus, we decided that this procedure would take place after the interview with a standardised editing process. Nonetheless, we are confident that the data revision module reduces the editing work connected with the survey, and therefore will reduce total survey costs. However, the cost side cannot be answered unequivocally: on the one hand the data revision probably reduces editing; on the other hand costly interviewing time is extended. The most important advantage of including a data revision module directly in the interview process, in our view, is that unclear and inconsistent information is either verified or corrected by the respondents themselves. Therefore, data collected with a data revision module are likely to be more reliable.

A limitation of this study is that it only shows the improvement of the data revision module compared to the modularised self-reports with respect to remembering and dating episodes. However, no gold standard is available; the data quality still refers to relative data quality. Whether the episode list is really complete and correctly dated will remain unclear because we have no information about reality and we can only make use of available information. Needless to say, it cannot be expected that all episodes or dates are generally retrievable from autobiographical memory. Hence, absolute data quality cannot be attained. However, we are confident that most errors appear as inconsistencies at some point in the interview process. However, for unemployment and employment episodes another way to assess the quality of retrospective life course data exists: they can be compared to process generated data provided by the German Federal

Employment Agency. Of course these data can neither be considered perfect nor seen as a benchmark reflecting reality. This step has not yet been done but, once completed, it could convince opponents of life course data of the adequacy of this method of data collection.

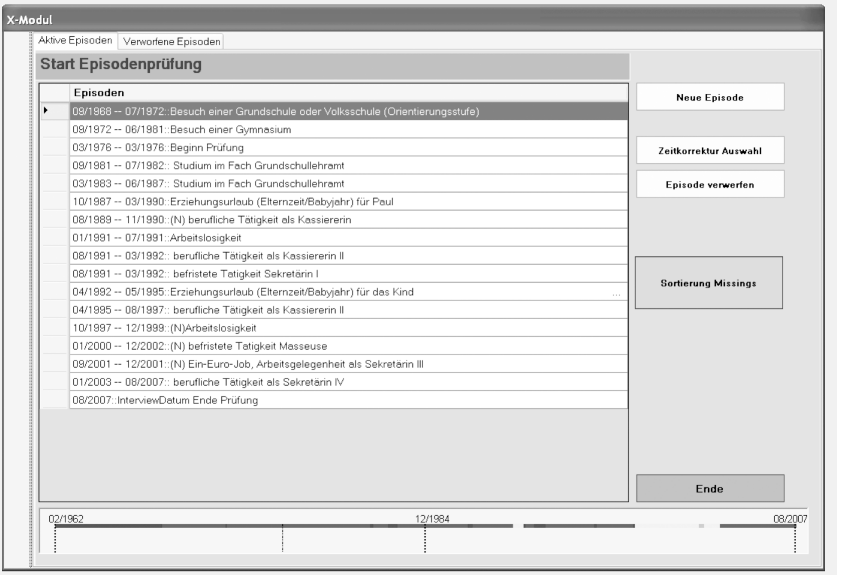
This chapter is one step towards incorporating insights from cognitive psychology into survey methodology. However, there are still a number of questions to be answered. Thus, future research can be expanded in several directions. First, a comparison of the modularised interviews with standardised conventional questionnaire instruments as well as the more flexible event history technique would be desirable. As the advantages and disadvantages of these methods become visible, it would allow future survey designers to choose the optimal strategy for their purposes. Second, because there is insufficient empirical research, the sequence of modules is chosen more or less arbitrarily. This is also true for the (reverse) chronological order. So far, using a reverse chronological order was found to produce ambiguous results (Tourangeau 2000: p. 40). Shedding light on those issues could again enhance data quality. Third, the peculiarities of unemployment episodes discussed above need further attention when designing new surveys. Finally, it would be interesting to assess how the flexible tool for displaying additional information is used in the modularised interview to stimulate recall. Thereby it would be possible to gain deeper insights into the functioning of such a data revision module and further improve it.

4.9 Appendix: Technical implementation: Design and technical features of the data revision tool

After the first stage of data collection is completed, the revision module calculates if there are any gaps or overlaps between the reported episodes by using pre-defined algorithms; it then starts the data revision routine. The technical implementation of such a data revision module is not trivial, especially when overlaps of specific events such as marginal employment episodes and schooling episodes or other possible overlaps are going to be permitted. Those have to be pre-defined when programming such a tool.

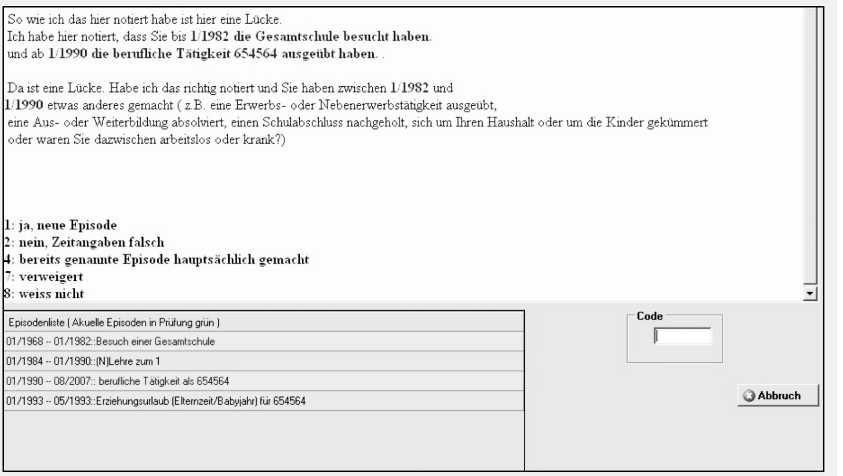
On the main screen of the data revision module all reported episodes are displayed in an episode list. This list resembles an event history calendar. Beneath, the episodes are visualised in their temporal extension as coloured episode bars in a time-line from the birth of an individual until the interview date. Gaps are shown in red and temporal inconsistencies are highlighted in light green. Figure 4.5 displays the main page.

Figure 4.5: Layout of the main page of the data revision module



Source: Infas, Bonn.

Figure 4.6: Layout of an automated problem solving routine in the data revision module



Source: Infas, Bonn.

Once all gaps and inconsistencies are retrieved, the standardised question procedure is started. The procedure also includes previously given open text answers of the respondent (here highlighted and in blue font) such as occupational titles, using dependent interviewing techniques. This personalises the question routine. Figure 4.6 displays an example of an automated problem solving routine of a temporal gap.

Three different possibilities how to fill this temporal gap are provided. First it is possible to insert a new episode of any type (Code 1). Second dating corrections can be performed (Code 2). Or third a so-called side episode (e.g. a secondary job) can be declared as main activity (Code 4). The respondent can also deny to give an answer (Code 7: refused or Code 8: do not know). Gaps and inconsistencies that ended before the respondent's 14th birthday are not resolved in the data revision module due limited available interview time.

Additionally, interviewers are allowed to insert, correct or delete episodes flexibly upon their own initiative based on information given by the respondent. Therefore, different buttons ('New Episode', 'Date Correction' or 'Delete Episode') on the first screen on the right hand side exist that allow these procedures. Furthermore comments can be written down at any point in the data revision module if changes could not be implemented for whatever reason, e.g. when a respondent suddenly realised that he wrongly dated several episodes with the same memory error (e.g. made a mistake and wrongly dated all schooling episodes by one year).

The information that the data revision module is completed and all gaps and inconsistencies are cleared up is passed on to the interviewer by giving a visual sign. Only then or in certain emergency cases when the module is stuck for a (technical) reason the data revision module can be quitted.

5 Does data editing really matter? The relevance of within and post-interview data editing in the IAB-ALWA study[32]

5.1 Introduction

Retrospective life course data contain information on the characteristics and the dating of past episodes. Thus, such data are extremely valuable for the analysis of event histories, life courses, and long-term social change (Blossfeld, Golsch and Rohwer 2007). Unfortunately, quality requirements for this kind of data are high: they should be as complete and consistent as possible in order to reduce total survey error (Biemer 2010) and ensure the quality of the research process (Hillmert 2002). Therefore, in previous studies such as several projects related to the German Life History Studies (GLHS), life course data were edited extensively after the interview was conducted. A team of data editors performed extensive checks concerning temporal and content-related consistencies. This resulted in a process which often lasted for several years. The editors had to go back to the tape-recorded interviews or had to phone the respondents again, in order to obtain consistent life history data. For examples compare Brückner (1995), Brückner, Hoffmeyer-Zlotnik and Tölke (1983), Tölke (1982), or Hillmert (2002). These processes were often way more time consuming than the entire survey process itself had been, but were nevertheless considered worthwhile for the sake of the resulting higher quality of the data (Hillmert 2002).

Notwithstanding such enormous efforts, survey methodology has up until now paid little attention to the subject of data editing as well as to other post-data-collection procedures. Groves et al. (2009), for example, dedicate merely three pages to data editing in general (pp. 345–347). Their definition of editing refers to the 'alteration of data recorded by the interviewer (...) to improve the quality of the data' (p. 345). However, their explanation mostly concentrates on edition procedures for cross-sectional studies such as range, ratio, balance, or consistency edits. Comparable standards for the temporal and content-related consistency of longitudinal data are only mentioned briefly – which is in stark contrast to the fact that Grooves and his colleagues generally describe longitudinal data to be the kind of survey-data that have the highest requirements for data editing. The summary of Groves et al. (2009) refers to the following: 'Editing systems will change as computer assistances moves to earlier points in the survey and becomes integrated

32 This chapter was written to connect chapter 4 with the other chapters of the dissertation. It is so far unpublished research.

with other steps in the survey' (p. 347). They conclude that then eventually editing after data collection itself will decline.

In the following, a survey which makes use of a design that uses computer assisted editing procedures will be described. Furthermore, it will be examined whether such a design is really beneficial from the perspective of data quality and efficiency. The IAB-ALWA study collected data on life courses of a nationally representative sample of the German resident population. In total, 10,000 respondents were interviewed on behalf of the Institute for Employment Research (IAB) between August 2007 and May 2008. The survey was administered by telephone (CATI) and systematically collected retrospective information in major life domains such as schooling, vocational training, employment or unemployment (Antoni et al. 2010, 2011; Gilberg et al. 2011; Kleinert, Matthes and Jacob 2008).

This chapter is structured as follows: first, the different steps of data collection and editing used in the IAB-ALWA survey will be described. Then, the results of the second step of data editing will be examined empirically. For both steps a specific example is chosen: the editing of parental leave episodes and periods of labour market inactivity due to childrearing. Collecting data on these episode types was especially error-prone. Reasons for this are, for example, recall-errors or mistakes made by interviewers while recording the information provided during the interview process (Matthes et al. 2012). Picking a specific example has been suggested as a strategy how to address im importance of the impact of data editing by Hillmert (2002). Thus, I will illustrate the effects of data editing procedures using the analysis described in Drasch (2011a) as an example. These analyses will be repeated with an unedited version of the dependent variable – the duration of family related employment interruptions of women. Then, the results using edited and unedited data will be compared in order to get an impression of the effects of data editing.

5.2 Data collection and editing in ALWA

5.2.1 First step – within-interview data collection and editing

Life history data in IAB-ALWA survey were collected in a modularised mode for each life domain separately. This means that during the interview each respondent had to go through his life repeatedly, during each round providing information on events in one of the various domains of interest. In a first step, after data collection itself was completed, the interviewer guided respondents through a computerised and standardised data revision module. This module combined data previously collected in different life domains and checked them for temporal inconsistencies

such as gaps and illogical overlaps. Previous research has shown that applying such a module helps to improve completeness and consistency of the retrospective data (Drasch and Matthes 2013).

In the 'children and parental leave module' for example, information on all children who ever lived in common household with the respondent was covered. Within this module, personal information on these children was collected as well as information on episodes of parental leave. For the latter, respondents had to answer whether they were eligible to a period of parental leave and following that, whether they actually went on parental leave for the respective child. When doing so, the respondents also had to report the starting and ending dates of the respective leave-episodes. However, this process involved several problems: First, respondents also reported the statutory two-month period of maternity protection as a period of parental leave, although interviewer instructions explicitly forbid doing so. Second, and more important, respondents wrongly reported the entire period of labour market inactivity that followed childbirth, even though they had been asked only for the time of parental leave, which is defined as the period during which they are guaranteed the right to return to their previous workplace. Third, respondents with several children had problems to assign a particular episode of parental leave to a specific child and instead often reported the entire leave-period (consisting of several episodes) for the first child and then additional episodes for the second child and for subsequent children. This resulted in several overlapping or parallel episodes of parental leave and in many cases in more episodes of parental leave than children reported living in the household (Matthes et al. 2012).

In the 'gap module', which was part of the data revision module, temporal gaps containing no activity at all were completed with information. Here respondents could report periods of labour market inactivity due to child care obligations and times as homemaker. This also included start and end dates of the respective episode. For a more extensive description of the modules and the within-interview editing compare the ALWA code book (Matthes and Trahms 2010) or the report on data editing (Matthes et al. 2012).

5.2.2 Second step – post-interview data collection and editing

In a second step, after the data editing within the interview itself, the data were checked again when the interview was finished. This was done by trained editors in a time consuming and costly data editing process comparable to the one used in the GLHS. However, in contrast to the former, data edition procedures did not include contacting respondents again or listening to audio recordings of the interviews (Matthes et al. 2012).

A team of ten editors was hired to perform consistency checks in order to improve data quality even further. The editors were undergraduates most of them studying sociology/social sciences or a related subject. The data editors received two days of training and were supervised by a team of two full-time employed supervisors at IAB. All editing rules imparted during the training as well as additional information were written down in an editing manual. In addition, the editors were trained to use the computer–tool 'ALWAEdi/ Patch Tales' (Künster 2008), assisting them in the editing process. This tool graphically displayed the life courses of individuals, which made it easier to identify temporal as well as substantial inconsistencies in the data. All in all, this editing procedure lasted almost one year and included the following steps: First, cases that only included unproblematic episodes in all different modules were identified and subsequently dropped for they required no further editing. In a second step, the remaining cases were then usually resolved applying the standardised editing rules which were laid down in the editing manual. In rare cases, the editing manual had to be extended when new problems were identified that could not be resolved with available standardised routines. Cases that remained unresolved after this step were finally resolved in a team of two editors and discussed with the editing supervisors. For a more detailed description of the editing process and the rules applied compare Matthes et al. (2012). Table 5.1 describes the cases processed in each of these editing steps.

Table 5.1: Descriptive statistics of the post-interview editing process

	Number of cases (N)	Per cent (%)
No editing	6,311	62.0
Standardised editing	2,651	26.1
Single case editing	1,215	11.9
	10,177	

In 62 per cent of the cases it was not necessary to perform any post-interview editing. This shows that using the data edition module for data editing within the interview (cf. Drasch and Matthes 2009, 2013) is relevant. However, around 38 per cent of the cases had to go through a subsequent editing step, 26 per cent through standardised editing and 12 per cent through single case editing. This also points out to the importance of these later editing steps.

During the post-interview editing process both modules – the 'children' and the 'gap module' – were examined simultaneously. According to the editing manual, episodes of parental leave were shortened to the maximum duration of parental leave of 38 months (36 months plus two months maternity protection). This is an

example for 'implicit editing' (Groves et al. 2009: p. 347), meaning that logically deduced rules were applied. In this case the rule was deduced from the fact that the maximum duration of parental leave in Germany did at no point in time exceed 36 months. The shortened periods were either added to a gap module or a new gap episode was created. Furthermore, parallel and overlapping episodes were edited. This procedure led to only one inactivity episode per month with a new episode or parental leave starting with the birth of a new child. This is an example for an 'explicit editing rule' (Groves et al. 2009: p. 347) meaning that the data must look like that for each respondent.

Due to these changes which mainly harmonised information over different respondents, I expect the following consequences in terms of overall data quality: first, the results of empirical analyses should be robust with regard to the different editing steps. This is because the major aim of the editing procedures was to correct the misunderstandings of the respondents. However, I expect that the size of the coefficients becomes more stable with each subsequent editing step. Moreover, I would also assume that standard errors are smaller for the final data, because less 'noise' – meaning less reporting errors – is left.

5.3 Empirical Part

5.3.1 The second step editing of parental leave episodes and periods of labour market inactivity – descriptive findings

The descriptive findings compare the data at three different stages of the edition process: first, I will examine starting and ending dates of the data before they have been checked in the data revision module. However, even at this stage prior editing steps had to be applied before using the data: first, where respondents could not name the particular month but only the season an event took place, one particular month was chosen; and second, when respondents could remember only the year of an event, the missing information on the month was set to the middle of a year. This was necessary in order to lose not too many episodes due to missing information regarding the month an event took place. Afterwards, the data were transferred to a linear time format, indicating the number of months that had elapsed since January 1969.[33]

In a second step, the data were examined after the within-interview editing and the data revision module had been completed. Also in this case, information on the month and year an episode started and ended was transferred into a linear

33 This corresponds to the Stata time format.

time format thus that dating of an episode only involved two variables – start and end date – instead of four (start month, start year, end year, end month).

Third, the data were examined after post-interview editing (also including a linear transformation of the dates). Table 5.2 compares the frequencies of the parental leave and gap episodes for the different editing steps.

Table 5.2: Comparison of original, data revision and edited data

	Comparison original data and data revision module data		Comparison data revision module data and post-interview edited data		Comparison original data and post-interview edited data	
	N	%	N	%	N	%
Same number of episodes in both datasets	6,439	81.6	5,843	66.7	5,834 (4,658 parental leave + 1,176 gap episodes)	68.2
More episodes in the better edited dataset	197	2.5	793	9.1	1,909 (1,609 parental leave + 300 gap episodes)	22.3
	6,636		6,636		7,743	
More episodes in the less edited dataset	1,250	15.9	2,103	24.1	809 (316 parental leave + 493 gap episodes)	9.5
	7,886		8,739		8,552	

When comparing the original raw interview data (i.e. before the data revision module) to the data obtained after application of the data revision module, one can see that the number of episodes for one person was identical at both stages in as much as around 82 per cent of the cases. This number drops to around two third of the episodes being the same when comparing the data of the second to those of the third step. This indicates that the post-interview editing process had a much higher influence on the number of episodes than data revision during the interview. Due to a better assignment of the parental leave episodes to individual children, however, around one quarter of the episodes were additionally created during the post-interview editing process. The deletion of episodes obviously played only a minor role in the post-interview editing process but a more important role in the data revision module. The total number of episodes increased because gap episodes were added in the data revision module. The number diminished

again during post-interview editing due to the deletion of parallel and overlapping episodes.

However, in total this editing process should not have affected to overall analyses of periods of family related periods of labour market inactivity because only leave episodes and homemaking episodes were re-assigned. The duration of parental leave episodes and their frequency should in turn have been affected more seriously. In the following section this will be examined in more detail.

Table 5.3: Comparison of start and ending dates of the original, data revision and edited data

	Identical start date	Identical end date	Identical start date	Identical end date
	Parental leave episodes		Homemaker episodes	
Original data and data revision data compared	97.6 %	98.6 %	90.7 %	90.4 %
Data revision data and edited data compared	79.5 %	77.4 %	75.7 %	83.6 %
Original data and edited data compared	81.9 %	68.2 %	75.3 %	62.9 %

Table 5.3 compares the start and ending dates of the original episodes, the episodes after the data revision module and after post-interview editing of matched episodes. The episodes were matched using a generated identifier variable that sorted the episodes with respect to the unique person identifier and the start and end dates. When comparing data from post-interview editing with those from within-interview editing, one can see that an overwhelming majority of the episodes was not changed with respect to their starting and ending dates. The number was higher again for parental leave episodes than for homemaker episodes. When comparing the original data to the final edited data one arrives at the conclusion that around 80 per cent of the parental leave periods and 75 per cent of the homemaker episodes had already identical start dates at this editing stage. The numbers are somewhat lower for the end dates, 68 and 63 per cent respectively. So, a maximum of 25 or 37 per cent of the episodes were changed with respect to the dating of the episode. Due to almost identical dates the numbers are similar when comparing data from the data revision module with the final data.

Table 5.4 displays the average durations of the different episodes. The parental leave episodes were longer in the original data than they were in the data revision data and the post interview edited data. In turn, the average duration of homemaker episodes was shorter in the original data than at the two other stages of the editing process. This means that the original durations significantly differ from the durations of the final data. This finding can be attributed to the editing process and

the clearance of overlapping and parallel episodes in this editing stage. In contrast to that, there are no significant duration differences as tested with t-test when comparing the original data and the data from the data revision module.

Table 5.4: Mean durations of parental leave and homemaker episodes at different stages of the editing process

	Parental leave episodes	Homemaker episodes
Mean duration original data	23.3 months	61.8 months
Mean duration data revision data	19.6 months	60.3 months
Mean duration edited data	20.1 months	68.4 months

5.3.2 How does data editing affect multivariate analyses?

The previous results have shown that the changes, especially the changes from the raw data to the data from the data revision module, had a striking impact on the frequencies as well as on durations of episodes. This violates one of the rules presented in Groves et al. (2009: p. 346) which claims that the frequencies should be maintained when editing data. But it is questionable whether this is also valid when editing longitudinal data and temporal information on episode dating in particular. Therefore, I replicate the analyses presented in Drasch (2011a) with the raw data including the season and missing value data correction and compare the results to those obtained using the final data after post-interview editing. A comparison of the data after within-interview editing with the final data or the raw data is difficult to establish because the data structure is very different compared to the other two datasets. More precisely, the original children and parental leave module was split up into two different modules which was not the case for the data editing module. However, the analyses presented here compare the two stages of the data edition process that should display the maximum difference. First, I present Kaplan-Meier estimators distinguishing the dependent variable by cohort.

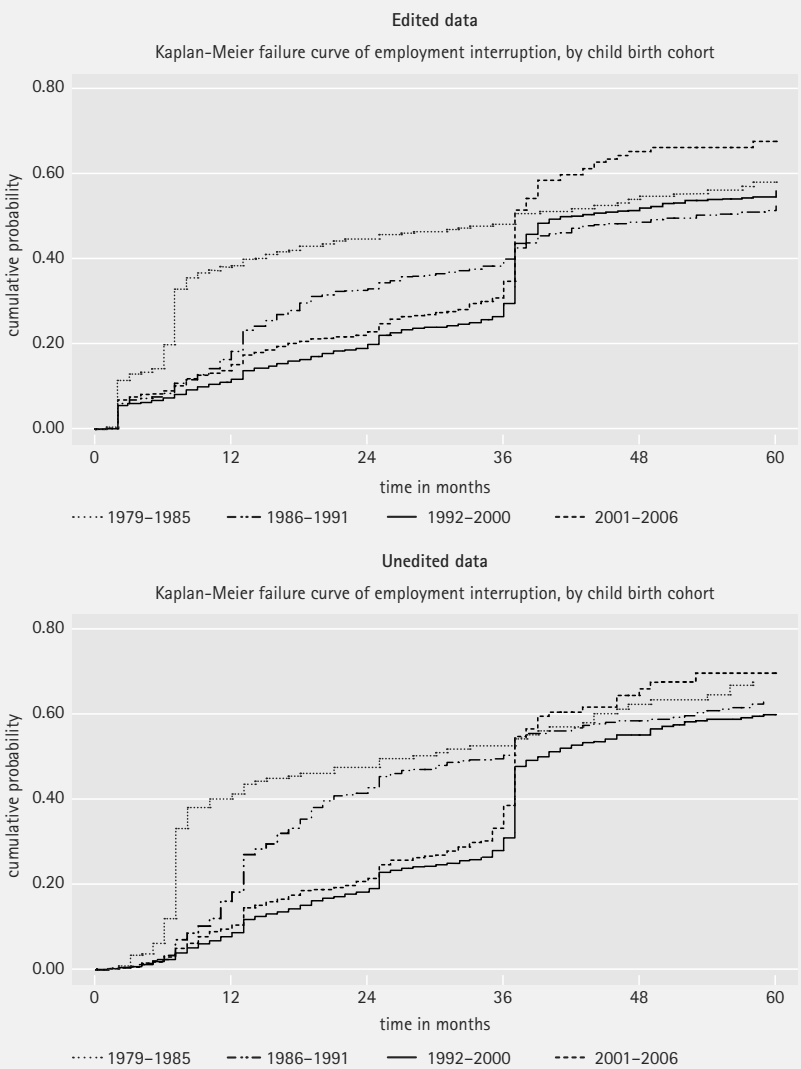
The results in Figure 5.1 show that there are similarities as well as differences. Similarities for all three cohorts (until 1986, 1992–2000 and 2001–2006) can be found regarding the shape of the curves. Furthermore, their overall probabilities to have returned to employment after 36 months are similar, as well. The major difference is that the 1986 to 1991 cohort is more strongly affected by the data editing process than the others and the pattern is very different for the two editing steps. However, due to the limited number of cases these results should not be over-interpreted, especially for longer interruptions.

Second, I estimate an identical model specification with an unedited but date corrected version of the dependent variable (the duration of a family related

employment interruption generated by adding parental leave and homemaker episodes) and the final linearised start and ending dates which are available to the public in the ALWA scientific use file (cf. Antoni et al. 2010, 2011).

Third, I estimate the coefficients using seemingly unrelated estimation and test the coefficients as well as the overall model for significant differences using a Wald (F-) test. This can be done because the samples of both analyses are overlapping.

Figure 5.1: Kaplan-Meier failure curves edited and unedited data



Source: ALWA, authors' own calculations.

Table 5.5: Discrete-time event history models on the likelihood to re-enter the labour market including results from seemingly unrelated estimation

	Original data	Edited data	Significant differences (F-tests)
Parental leave stage (ref. around expiration of parental leave)			
Before expiration of parental leave	0.150*** (0.013)	0.162*** (0.013)	**
After expiration of parental leave	0.444*** (0.060)	0.510*** (0.061)	
Educational attainment (ref. university degree or similar)			
No vocational degree/no schooling degree and apprenticeship	0.409*** (0.070)	0.344*** (0.067)	
Lower schooling degree and apprenticeship	0.732* (0.107)	0.631** (0.107)	
Higher secondary schooling degree and apprenticeship/higher vocational training degree	0.695** (0.093)	0.647* (0.100)*	
Educational attainment in partnership (ref. homogamy)			
Hypergamy (woman lower than partner)	1.114 (0.147)	1.237 (0.186)	*
Hypogamy (woman higher than partner)	0.873 (0.101)	0.986 (0.131)	
No partner	1.703*** (0.220)	2.631*** (0.354)	
Child birth cohort (ref. 1979–1985)			
1986–1991	0.803 (0.123)	0.625** (0.092)	
1992–2000	0.727 (0.128)	0.627** (0.111)	
2001–2006	0.828 (0.169)	0.778 (0.165)	
Age (in years)	1.055*** (0.014)	1.049*** (0.014)	*
Age of youngest child (in years)	0.977 (0.053)	0.524*** (0.039)	***
Age of youngest child squared	0.999 (0.003)	1.034*** (0.004)	***

Table 5.5 continued

	Original data	Edited data	Significant differences (F-tests)
Maximum number of children in household (ref. one child)			
Two children	0.671*** (0.053)	0.694*** (0.053)	
Three and more children	0.475*** (0.070)	0.489*** (0.069)	
Labour force experience (in years)	1.019* (0.009)	1.011 (0.009)	
Unemployment experience (in years)	0.837** (0.056)	0.695*** (0.050)	
Regional type (ref. urban/agglomeration)			
Rural	0.864 (0.090)	0.917 (0.109)	
Not defined	1.027 (0.145)	1.125 (0.179)	
Regional unemployment rate	1.004 (0.025)	1.034 (0.024)	
Observations	90,887	118,368	Joint test of significant
AIC	12,376.9	15,076.0	Differences (excluding time-dependency)
			$chi^2(20) = 93.15$

* p < 0.05, ** p < 0.01, *** p < 0.001

The results in Table 5.5 show the following: The odds ratios obtained from both estimations are similar with only some minor exceptions. These apply to the cohort variable, for example. The significance levels are similar, too, with only some minor deviations of one significance level. In essence, irrespective of the edition status of the data used, one would arrive at similar conclusions to be drawn and also the interpretations of the coefficients do not differ substantially. When looking at the results from the seemingly unrelated estimations[34] one does not find significant differences for almost all independent variables, the age of the youngest child

34 Seemingly unrelated estimation is not possible with models for recurrent events used in the original version of the analyses. Therefore I examined standard event history models clustered by person-identifier. Significance tests were estimated using coefficients and not the exponentiated coefficients displayed, which does not influence the overall results.

(linear and squared) being the sole exception. This finding is most likely a result of the editing process, because in many cases one leave period was split up into several ones. The same explanation holds for the results regarding parental leave. The test of the overall model reveals a highly significant difference between the different versions of the data. This result is not surprising, because the dependent variable is different for both models while the independent variables are derived from the same edited data. In sum, I would still argue that there are more similarities than differences in the models compared, which indicates that the editing process has generated more complete and coherent data but the results and the interpretations remain the same.

5.4 Discussion and conclusion

The results show that although quite some changes were made during the editing processes, the results and implications concerning a specific research question substantially remain the same, independent of which version of the data are used. Whether this holds with respect to other research questions as well, cannot be answered conclusively at this state of research. However, because I have chosen a research question for which many of the editions applied are relevant, I am confident that the results might at least to some extent be generalised. In sum, my conclusion is that it might indeed be doubted that the financial means required for the post-interview editing are really spent wisely. This step of the editing surely produces 'better' data with respect to temporal and content-related consistency on the individual level. However, overall the errors seem to be more or less 'at random' meaning that the editing procedures reduce noise but substantially do not change the results.

So all in all, with only this short examination of a single example for post-survey data editing, the discussion on whether post-survey data editing is indeed necessary will most likely not be answered once and for all. Nevertheless, post-survey data editing is without doubt a very costly step and putting more effort in within-survey editing done in collaboration with the respondent might offer a promising and more cost efficient alternative. Due to increasing technical possibilities, we have seen rapid progress regarding such in-survey methods in recent years. However, which method will work best does still depend on the specific circumstances of the survey. In the adult stage (start cohort 6) of the NEPS (National Educational Panel Study), for example, no post-interview editing has been applied so far. Among the main advantages of this strategy is that total survey quality – meaning the quality from producer and user perspective (Biemer 2010) – is increasing due to faster availability of the data.

The results presented here could be extended in several directions: first, at least one different research question should be picked and a similar procedure should be applied. Especially analyses of transition events that are less prone to memory-error than is parental leave could be of interest. One example for such an event is employment episodes. This would give us at least some idea about whether the above stated assumption holds and the results presented here can indeed be generalised. Second, in the analyses presented only the dependent variable was changed and an edited and uneditied version of this variable was used to perform the data analyses. However, it might also be possible to edit the independent variables applying similar procedures. This certainly involves enormous data preparation efforts, which are beyond the scope of this chapter.

6 It's not (all) about the money: What are prospective returners willing to accept for a job? Evidence from a factorial survey among mothers[35]

Abstract

Mothers still earn substantially less than women without children; this discrepancy is often referred to as the motherhood wage penalty. This chapter sheds light on one possible explanation for this penalty: the willingness to accept lower-paid jobs that have more favourable characteristics to reconcile family and work. These assumptions were formulated in the theory of compensating wage differentials (CWD). Empirically, the willingness to accept lower-paid jobs that have more favourable characteristics is examined by using a factorial survey, which is a quasi-experimental design often used to examine norms and values. The survey was conducted in an evaluation project by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) and the Federal Employment Agency (BA) as an online supplement to a telephone survey. The data are examined with a series of multilevel regression models. The results suggest that mothers are indeed willing to pay for better job characteristics and that in addition to wages, non-monetary characteristics are also important.

JEL classification: J31, C81, C83, Z13

Keywords: female labour force participation, motherhood wage gap, compensating wage differentials, quasi-experiment, factorial survey

6.1 Introduction

Women with children earn substantially less than men as well as women without children. This gap is referred to as the motherhood wage penalty. In Germany, empirical results with respect to this gap indicate that mothers earn on average between 19 per cent and 24 per cent less than women without children (Felfe 2012; Gangl and Ziefle 2009; Beblo, Bender and Wolf 2009). Several possible explanations for the wage penalty for motherhood are proposed in the literature. First, knowledge and skills are not fully transferable over time and human capital erodes in the course of employment interruptions (e.g. Kunze 2002; Mincer 1974). Second, employers might discriminate against mothers (e.g. Budig and England 2001). Third, mothers can be expected to be less mobile than non-mothers and

35 This chapter is a joint work with Martin Abraham. Currently, it is under preparation for submission to a peer-reviewed journal.

therefore have less access to better-paid jobs (e.g. Becker 1991). These explanations are all well examined. However, especially in Germany, a substantial portion of the motherhood wage gap remains unexplained and cannot be attributed to differences in human capital endowment (Felfe 2012). More importantly, a large portion of the motherhood wage penalty cannot be explained through other factors, e.g. a selection of women into motherhood.

These results are based on studies that examine realised employment re-entries of mothers. Essentially, the wages of women with and without children are compared after controlling for several factors, such as individual and employment characteristics. However, when examining realised employment re-entries, there are some mothers who want to work but do not receive an acceptable job offer. We argue that an appropriate explanation for a mother's labour market participation must take into account the unwanted absence of women from the labour market. Otherwise, estimations of the wage gap will be biased because non-employment among mothers is not randomly distributed.

In this context, we focus on a mechanism that assumes that mothers select themselves into mother-friendly jobs and that those jobs pay less (Becker 1991; England 1992). Theoretically, this self-selection can be explained by the fact that mothers are willing to 'pay' for certain job characteristics (such as flexibility of working hours) by accepting reduced job offers. This theory of compensating wage differentials (Rosen 1986; England 1992) is widely accepted as a possible explanation for the gender wage gap; however, empirical evidence is scarce, especially for Germany.

One problem with empirical evidence regarding compensating wage differentials is that information about rejected job offers is required. With knowledge of unrealised re-entry behaviour, it would be possible to trace the importance of certain job characteristics in the re-entry decision. In order to consider the types of job characteristics that are important for shaping the re-entry decision, it also becomes necessary to examine non-entries. So far, little research on rejected job offers exists. Thus, our main aim in this chapter is to address the question of whether the selection of mothers into jobs with certain favourable characteristics actually exists. Additionally, if such selection exists, we search for the mechanisms that are at work to explain the selection of jobs with mother-friendly characteristics.

The insufficient empirical research on the decision to accept or reject a job is mainly because of a lack of adequate data. Existing survey data provide no information on rejected job offers and instead only involve realised labour market re-entries. Bearing in mind that non-entries are difficult to observe in surveys, other strategies become necessary to address the question of whether mothers select themselves into jobs with more favourable characteristics. In this chapter,

we explicitly experimentally describe job offers and examine the probability that a hypothetical job offer would be accepted by a respondent. Using a factorial survey as an experimental design, we seek to determine what types of job characteristics are important when making the decision to accept or reject a job offer. This instrument is applied in a study of long-time inactive mothers who are in the process of re-entering the labour market. With our factorial survey design, we are able to take a closer look at the decision process itself. More precisely, we confront prospective and recent female re-entrants with a number of hypothetical scenarios, called vignettes, that contain job offers. Those job offers include a number of selected job characteristics with more or less favourable conditions. For each of these scenarios, the women have to decide how likely they would be to accept the given job offer.

The respondents were participants in an evaluation project conducted on behalf of the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) and the Federal Employment Agency (BA). The following research questions are addressed: What are prospective returners willing to accept for a job? More precisely, are some job characteristics more important than others? Do women place compensating wage differentials on certain job characteristics? Are there differences between women with different individual characteristics? The results of this research seek to contribute to the more general inquiry into how mothers' re-entry into the labour force after a period of inactivity can be facilitated.

The chapter is structured as follows: The next section presents selected empirical findings on the characteristics that influence the labour market re-entries of mothers and on job characteristics that are important to employees when re-entering the labour market. The third section outlines the theoretical framework, including insights from the economics of the family and the theory of compensating wage differentials (CWD). Then, hypotheses on the probability of accepting or declining a presented job offer are derived. In the next section, the design of the factorial survey that contains selected job offers is outlined. Subsequently, the analysing strategy and variables are explained. The results of the analyses are presented in the sixth section of the chapter. Finally, the findings are summarised and discussed.

6.2 Previous research

The existing literature focuses on the question of when mothers with certain characteristics are able to return to the labour market. The empirical research shows that mothers with higher qualifications and higher earnings return to the labour market sooner than those with lower qualifications (see e.g. Bredtmann, Kluve and Schaffner 2009; Kreyenfeld et al. 2007b). Also, interruptions for children

born in the late 1980s are longer than in the early 1990s (Grunow, Aisenbrey and Evertsson 2011). Furthermore, some evidence is found that educational differences in labour market re-entries have only emerged over time and are subject to strong institutional control due to the introduction of generous parental leave legislation (Drasch 2011a). Moreover, we find that older women are less likely to return than younger mothers (Weber 2004). In Germany, mothers often return to the same job as the one held before the interruption, although longer interruptions increase the risk of return to a less prestigious position (Aisenbrey, Grunow and Evertsson 2009). Frodermann, Abraham and Müller (2012) find that the determinants for re-entry differ significantly for part-time and full-time work. Grunow and Müller (2012) and Drasch (2011b, 2012) find East-West differences with respect to re-entries. Grunow and Müller (2012) also find adaptation tendencies for East-West mobile mothers as compared to mothers from West Germany. In addition, the number of children has no influence on re-entry in the East, but the more children a mother has, the slower she returns to the labour market in the West (Drasch 2011a).

Furthermore, results on the effects of job characteristics on labour market re-entries in general can be found. Groot (1990) finds that the labour contract type, the job level, the commuting time to and from work and the length of the working hours have significant impacts on job-acceptance. Glass and Camarigg (1992) explore occupational gender segregation and find that both schedule flexibility and better working conditions improve the reconciliation of work and family.

This literature draws its findings mainly from large longitudinal data sets to observe the actual re-entry of mothers. However, there are indirect approaches, such as the strategy of asking women for their preferences regarding jobs. For example, Klenner (2007) addresses questions on the properties of family-friendly organisations. Descriptive results reveal that family-friendly working hours are especially important for employed mothers. Approximately 20 per cent of the female respondents are satisfied with their working hours, approximately 55 per cent want to reduce their working hours, and 25 per cent want to work more than they actually do. Furthermore, irregular working hours, such as unscheduled or fluctuating working hours, are problematic.

To summarise the existing literature, we find many studies focusing on the determinants of mothers' re-entries into the labour market. However, the main focus is on women's characteristics, such as qualifications, age or household situation. Far less is known about the characteristics of the jobs available to women attempting to resume their occupational careers. As previously mentioned, the literature is limited by the fact that declined job offers are not included in standard data sources. Moreover, mothers who do not expect to find an adequate job may not search for work at all. We tackle this problem with our experimental

design, which assigns hypothetical job offers randomly to mothers. Hence, we are able to control for the selectivity of the real matching process and observe the 'pure' preferences of women for certain jobs. Thus, we provide a different strategy for addressing the question of what 'price' mothers are willing to pay for favourable job characteristics.

6.3 Theoretical framework and hypotheses

In this section, we will discuss theories about the conditions under which non-employed mothers will accept a job and thus return to the labour market. Of course, given that the labour supply and, thus, the income of those mothers is zero, a higher wage potential will increase the tendency to accept a job offer. Moreover, if we assume that those women already had a job before they had children, the depreciation of human capital becomes important to their decision. Human capital theory assumes that wages are paid according to workers' marginal productivity, which in turn is determined by education. Because this human capital depreciates over time, wages should decrease after a (longer) period of non-employment (Mincer and Ofek 1982). Of course, people try to minimise the effects of human capital depreciation. Thus, we hypothesise as follows:

Hypothesis 1: The higher the wage reduction compared with the job before the interruption, the lower the likelihood that mothers will accept the job offer.

Moreover, depreciation of human capital can continue even after re-entry into the labour market if one's capabilities are not used in the current job. When people accept a job below their qualifications, they not only earn less than is otherwise possible but also lose additional human capital over time. This leads to our second assumption:

Hypothesis 2: Mothers are expected to have a lower preference for job offers that are clearly below their level of initial qualification than for job offers which include a job requiring the same or slightly lower level of qualification.

Although wages should be an important determinant for accepting jobs, our main reasoning is based on the assumption that the search process as well as the non-pecuniary characteristics of a job are relevant for the decision to accept or decline a job offer. This has been stated in sociological as well as economic research (Ziegler, Brüderl and Diekmann 1988; Devine and Kiefer 1991; Rogerson, Shimer and Wright 2005). The importance of non-pecuniary job characteristics should

be especially true for mothers if we assume that child care is still an important task for these women even after they return to paid work.[36] As argued by various researchers, this argument leads to women's preferences for so called 'mother-friendly' jobs.

For these arguments, it can be assumed that children (especially at younger ages) are time-consuming. In addition, time spent caring for children is less flexible than time that can be spent on other activities because external caring times are fixed (e.g. fixed kindergarten or school hours) and because unexpected time requirements for caring arise, e.g. when a child is ill. Thus, women with children seek jobs that are 'mother-friendly' in the sense that those jobs are 'more compatible with the demands for their home responsibilities' and allow for this temporal flexibility (Becker 1991: p. 75). For example, one can expect that women with children are less able to work irregular working hours. Also, if a couple gets divorced, children most likely stay with their mothers, who then become single female parents. This risk also most likely contributes to women's preferences for jobs that facilitate the reconciliation of work and family. Women invest more time and energy in domestic human capital and therefore have less time and energy to invest in market human capital. This also contributes to the explanation of why women with caring and household duties are expected to have lower wages than men. Their opportunity costs are assumed to be higher than those of women without children because mothers are less flexible. Furthermore, mothers' earnings are supposedly lower because of their demands for part-time work and flexible working hours (Becker 1991: pp. 57). In summary, the role of mothers as primary caregivers leads to the following hypotheses about women's preferences for a limited volume of work, the ability to plan working hours and temporal flexibility:

Hypothesis 3: Due to their role as primary caregivers, mothers are expected to have a higher preference for working fewer hours than for working more hours as initially planned upon the decision to re-enter the labour market.

Hypothesis 4: Due to their role as primary caregivers, mothers are expected to have a higher preference for flexible working hours or working hours that can be negotiated with the supervisor than for fixed working hours.

Similarly, mothers can be expected to be less able to work at jobs that require regular travelling activities and are less able to spend time on daily commuting.

36 We base this assumption on the empirical fact that women continue to invest more time in childcare than men. Whether this is due to the comparative advantages of women (Becker 1993) or is based on male dominance (Wetterer 2002; West and Zimmerman 1987) does not matter here.

Travelling activities, especially those lasting several days, would require overnight care arrangements for children. Also, commuting is time-consuming and cost-intensive. For example, in the case of a family emergency, the mother needs time to commute back to her place of residence. Therefore, the following hypothesis on commuting can be proposed:

Hypothesis 5: The longer the commuting time to the job, the less likely it is that a mother will have a preference for that job offer.

Hypotheses 1 to 5 are based on the idea that jobs with certain characteristics are more preferable than jobs that do not have these characteristics. The next step is to determine the extent to which women are willing to 'trade' certain characteristics for others. Especially if women are willing to accept a lower wage in order to obtain more flexibility, the willingness to trade certain characteristics would contribute to the observed gender gap in wages. This is the basic idea of the theory of compensating wage differentials (CWD), which is also called the theory of equalising differences. This theory was originally formulated for labour economics by Rosen (1986) and was adapted to sociology most notably by England (1992). According to this theory, the (hourly) wage does not act as a single decision criterion to accept or decline a job offer. Some jobs are more desirable despite lower pay because they are 'interesting, safe, pleasant or otherwise satisfying' (England 1992: p. 69). Therefore, these jobs are performed for lower wages than more burdensome jobs. As one decision criterion, the 'mother-friendliness' of the job might be crucial. For example, mother-friendly jobs are jobs that grant child care, have more flexible working hours or offer other benefits (Levanon, England and Allison 2009). It can be assumed that there are also other job-related characteristics that determine whether a job is mother-friendly or not, such as the security of planning working hours.

However, we are not only interested in the compensating differentials that are determined by the market; we are also interested in the workers' marginal willingness to pay (MWP) for job amenities. The CWD theory provides the analytical framework for the mother's willingness to pay for job amenities. The decision to accept or decline a job offer is embedded in a rational decision-making process and is assumed to depend on the expected costs and benefits of the presented alternatives.

To this end, the CWD theory has often been used to address the question of physical disamenities, such as dangerous working conditions (Duncan and Holmlund 1983). However, it also seems useful for addressing other types of working conditions, such as practical or mental working conditions. To address whether CWDs were present in our study, we assume that in addition to wages, other characteristics also play roles in the decision to accept a job offer and that

mothers accept reduced wages in exchange for better job characteristics. More precisely, we expect the following:

Hypothesis 6: Mothers accept reduced wages for better job characteristics, e.g. less commuting time and more temporal flexibility in their jobs.

We assume that the job characteristics determined to be more important depend on the situation of the person looking for the job. If a woman is confronted with child care obligations, as in our study, she will prefer a job that allows for flexible working times. If another woman does not have such restrictions, she will care more about the work content of the job itself. Examples of such women include young labour market entrants without family obligations. Prospective female job-returners are assumed to have many restrictions because of their family obligations, and they are supposedly more likely to be affected by flexibility constraints than by monetary constraints. This is reinforced by the fact that these women are often the future second earner of the family and come from a non-employment situation. Also, according to the work-family-conflict literature (see Schieman, Glavin and Milkie 2009), temporal flexibility characteristics are especially conflictual, and we expect them to be more important than monetary characteristics. In summary, we assume the following:

Hypothesis 7: For mothers, job characteristics related to flexibility, such as flexible working hours, are more important than monetary characteristics, such as wages.

People are heterogeneous with respect to their individual characteristics and can differ in several respects. For example, people can differ with respect to their individual pressure to find re-employment. First, for mothers with a higher family income, it might be less important to re-enter the labour market immediately. Such mothers can more carefully select a job offer. Second, for mothers in a partnership where the partner earns a sufficient wage, a wage reduction might be less important than for single mothers who need the income to support the family. Third, for mothers who are already registered as unemployed or are actively searching for work, it may be more urgent to re-enter the labour market than for non-registered mothers. Therefore, women who are under higher pressure to find a job may react differently to job offers and are expected to be less reluctant to accept negative job characteristics. Thus, the elasticities of women under pressure and women not under pressure are expected to differ. However, it must be taken into account that the wage offer has to be sufficiently high to make the family secure. In summary, one can derive the following hypothesis:

Hypothesis 8: For mothers under pressure to find a job, negative job characteristics, such as reduced wages, over-qualification or commuting time, are expected to influence their preference for accepting a job offer to a lesser extent than for mothers not under pressure.

6.4 Data and methods

6.4.1 Factorial survey data

In the empirical part of our study, we aim to test our hypotheses using a factorial survey as a quasi-experiment. In a factorial survey, respondents receive a number of hypothetical scenarios, or so-called vignettes. For each of the scenarios, the respondent must provide a decision. The design of the factorial survey enables us to disentangle the causal influence of the independent variation of a limited number of dimensions (characteristics) on the decision-making behaviour of the individuals. Therefore, the vignettes share a basic situation and an assessment scale but they differ in the characteristics of the vignette dimensions (Frings 2010: p. 193). Vignettes are also suitable for examining decision-making behaviours in complex situations and allow for a systematic evaluation of the effects of contextual conditions that are in reality difficult to test.

The application of a factorial survey instead of a standard approach using longitudinal data, for example, has the following advantages: First, the supply side of the job-acceptance process is completely controlled. Irrespective of their personal characteristics, all respondents receive the same number of job offers and can express their job preferences. This leads to the ability to observe unbiased preferences that are not based on a selective sample of mothers who have re-entered the labour market successfully. Second, less attractive job offers can be studied, leading to a more complete picture of the labour market re-entries of mothers. Third, a factorial survey is an ideal way to determine the relative importance of influential factors because respondents cannot answer that all job characteristics are equally important. This is often the case in conventional surveys.

The factorial survey presented in this chapter was implemented in an evaluation project by the Institute for Employment Research (IAB). It was conducted as an online supplement to a telephone survey (CATI).[37] The study evaluates a joint model project ('Perspektive Wiedereinstieg') of the BMFSFJ (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth) and the Federal Employment Service (BA). The

37 The project (excluding the factorial survey) was financed by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ).

model project started in 2009 in different regions of Germany. The aim was to give selected project partners the opportunity to test innovative strategies to promote the re-entry of women into the labour market after a family-related employment interruption. Those project partners are often non-commercial organisations working in the field of further education and are located in different cities and regions of Germany in both new and old federal states.[38] To participate in the model project, applicants were supposed to have interrupted paid employment for at least three years. However, they were allowed to be involved in marginal employment during this period of inactivity. The reason for the employment interruption had to be related to caring obligations, which included child care as well as elder care. In principle, the program was also open to men, but only a few participated. Thus, due to the limited number of male participants, they were excluded from the evaluation and only women were examined. The program participants were asked by the program providers to give their consent to participate in the evaluation project. Furthermore, some basic information about the women was collected in an entrance questionnaire (e.g. marital status, level of education, number of children, employment status). This information included contact details that were transferred to the IAB.

In addition to the participants in the project, a comparison group of women was also interviewed. Those women were registered at the Federal Employment Agency (BA) as unemployed or actively searching for work. The comparison group was generated with a two-stage matching procedure. First, a sufficient number of registered returners living in structurally similar administrative districts were selected with Nearest Neighbour-Matching (NN-Matching) techniques. Then, women with similar observable characteristics (e.g. level of education) living in those regions were matched with propensity score matching (Götz et al. 2010). We thus assume that the re-entrants under study constitute a rather homogenous group.

The data collection was performed in two different waves. In the telephone surveys, a total of 814 women in the first wave and 940 women in the second wave were interviewed. These women had interrupted their employment due to childbirth for a period of more than three years and were currently in the process of re-entering the labour market. Among them, 524 women (68.4 per cent) in the first wave and 643 women (68.4 per cent) in the second wave gave their consent to participate in the online supplement. Thus, those women constitute a convenience sample. A convenience sample is sufficient because we use a quasi-experimental method for both the telephone survey and the online supplement. In the telephone survey, a treatment-control group design is chosen, and the online factorial survey can also be classified as a quasi-experimental method because of the assignment

38 More information can be found at http://www.bmfsfj.de/BMFSFJ/gleichstellung,did=120704.html.

of a random set of vignettes to the respondents. Thus, we are able to assess the causal effects of randomly assigned treatments. However, whether those effects can be found beyond this sample is, of course, uncertain.

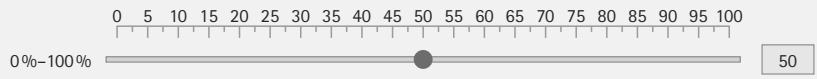
In addition to the personal information obtained from the telephone interview and the data collected from the on-line experiment, process-produced data from the Federal Employment Agency (BA) and regional information on the labour market and child care situations enhance the opportunities for analysis. The CATI data were collected between September and December 2010 and between September and December 2011. Follow-up surveys were conducted in May and June 2011 and in May and June 2012. The factorial survey was administered between November 2010 and January 2011 and between November 2011 and January 2012. A total of 255 women in the first wave and 173 women in the second wave participated in the factorial survey.[39]

The design of the factorial survey, e.g. the number of vignettes per respondent, was determined to be consistent with previous methodological research (cf. Beck and Opp 2001; Steiner and Atzmüller 2006; Auspurg, Abraham and Hinz 2009; Jasso 2006; Sauer et al. 2009; Wallander 2009; Dülmer 2007). The vignette dimensions for the prospective job-returners were selected according to the current state of the research as well as exploratory conversations with female returners and selected experts on this topic. For the selection, it was also important that the dimensions were universally valid, i.e., that they most likely apply to any of the returners. Therefore, for example, we did not vary the child's age or the availability of child care facilities. Furthermore, the job characteristics needed to be observable without great effort, and as a result, characteristics such as working atmosphere were excluded. Figure 6.1 presents a sample vignette and the answer scale. The characteristics that are varied are displayed in bold.[40]

Figure 6.1: Sample vignette

You **have just started to look for a job** und now receive the first offer. You have **no open applications** left. You are **clearly over-qualified** for this job. The **working hours** do not meet your requirements. You could only work less than you originally. Commuting to your new job would take **45 minutes one way**. Your **net salary** about **10 per cent less** than the one you received before you interrupted employment career. Your new job **has fixed working times** that were **scheduled beforehand**.

How likely is it that you are going to accept the job-offer?



Source: Online supplement evaluation study 'Perspektive Wiedereinstieg'.

39 Furthermore, 172 women in the second wave participated in an additional experiment that addressed the robustness of the results with a slightly different experimental design. Those women are going to be examined in a different paper.

40 This is an English translation of a sample vignette; originally, the vignettes were written in German.

6.4.2 Methodological aspects of the factorial survey

A quota selection according to the D-efficiency criterion of the vignette universe (N=974) – all possible combinations of the seven varying dimensions – was performed (Dülmer 2007). From the vignette universe, 200 vignettes were selected. The dimensions of those vignettes are largely uncorrelated, and the variation of the dimensions reaches a maximum, meaning that the D-efficiency also reaches its maximum. In our case, we obtain a value of 98.1, with 100 being the maximum. This orthogonalisation considers all main effects and first-order interactions which denotes a Resolution V Design (Dülmer 2007; Kuhfeld et al. 1994; Kuhfeld 2010). Ten vignettes were presented to each individual in random order. In total, we made use of 20 different vignette decks.[41] For small samples, this quota sampling is superior to a random selection and allocation of vignettes to individuals. It is based on a systematic compilation of vignettes with the explicit goal of covering all possible combinations equally (Sauer et al. 2009: p. 5; Dülmer 2007).[42]

6.4.3 Analysing strategy

A multi-level structure is present in the data because every respondent provides an answer to more than one vignette. Using OLS regression, this would lead to biased estimates. We correct the bias due to this cluster data by using multilevel modelling. Thus, we first estimate a random intercept model and include a respondent-specific intercept in the analyses. This intercept contains the time-constant effects of personal characteristics that cannot be included in the model (Rabe-Hesketh and Skrondal 2008: p. 91). The model can be formulated as follows:

$$Y_{ij} = \beta_0 + \beta X_{ij} + \gamma Z_j + \sigma, Z_j X_{ij} + \mu_j + \varepsilon_{ij}$$

where Y_{ij} denotes the vignette judgment; β_0 is the intercept; βX_{ij} is the set of variables on the vignette level; γZ_j denotes the variables on the individual level, $\sigma, Z_j X_{ij}$ denotes the possible interactions between the individual and the vignette level; μ_j is the time-constant individual specific error term; and ε_{ij} denotes the remaining error term. As a subsequent step, it becomes necessary to test for the presence of random coefficients, thus varying the effects for different respondents (Rabe-Hesketh and Skrondal 2008: p. 141).

41 The vignette selection was performed with SAS and the macros %mktex and %mktblock. This strategy was proposed by Kuhfeld (2010). We thank Katrin Auspurg, University of Constance, for the technical implementation.

42 Steiner and Atzmüller (2006) provide a concise overview of the various strategies to select vignettes and build the vignette decks. In addition, they provide information about the statistical analysis techniques used to interpret the results.

The dependent variable denotes the probability of accepting the given job offer and ranges from zero per cent to 100 per cent with intermediate steps of five per cent. We will treat this as a metric variable. We assign eight dimensions that describe the job offer. The monetary characteristics of the job offer are modelled with different amounts of wage loss compared with the previous job. The commuting time to and from work is varied to include monetary incentives for the costs of transport as well as non-monetary incentives, such as stress and time. Non-monetary characteristics are modelled by the level of qualification needed for the proposed job compared to the qualification originally obtained. Characteristics related to the temporal flexibility include the flexibility of the working hours and the desired volume of work. In addition, the duration of the search process and the number of job offers received are crucial for the decision to accept or decline a job offer. These characteristics are additionally controlled for in the factorial survey. Thus, on the vignette level, we control for whether the woman has just begun her search or has already been searching for some time. Another variable controls for whether the woman has open applications remaining.

Characteristics on the respondent level include the employment status of the partner, whether children under six are present in the household, the age of the respondent, whether she is under pressure to find a job (e.g. because she is unemployed or a single parent), the duration of the interruption and, as measures of human capital, whether the woman is holding a tertiary degree. Furthermore, we take into account whether the woman lives in the new or old federal states of Germany and whether she participated in the first or the second wave. Additionally, we always control for whether a woman participated in the model project or whether she was included in the subsample of registered employment returners. Table 6.1 displays the summary statistics of the dependent variable and variables on the individual level.

Furthermore, we are interested in modelling the relative importance of the variable dimension. To achieve this goal, we can make use of the properties of the factorial survey: uncorrelated main effects and first order interactions. When independent variables are mutually uncorrelated, a decomposition of the R^2 is possible, and the importance of a variable is often determined from its contribution to the R^2. A similar approach is used when estimating the contribution to the explained variance. The influence of one dimension can be estimated by calculating ratio of the explained variance to the overall variance (Berk 2004: pp. 117; Bring 1994). In addition, it is possible to address the question of relative importance by calculating (semi-)partial correlations. For the given properties, one can also directly examine the t-values of the parameters (Bring 1994), the sizes of the parameters or the bivariate correlations between the parameters and the dependent variables.

In this chapter, we mainly interpret the proportion of the explained variance relative to the total explained variance on the vignette level because these values conveniently add up to 100 per cent. Additionally, we also present the significance levels of the partial correlations that lead to similar conclusions as the explained variance.

Table 6.1: Descriptive statistics

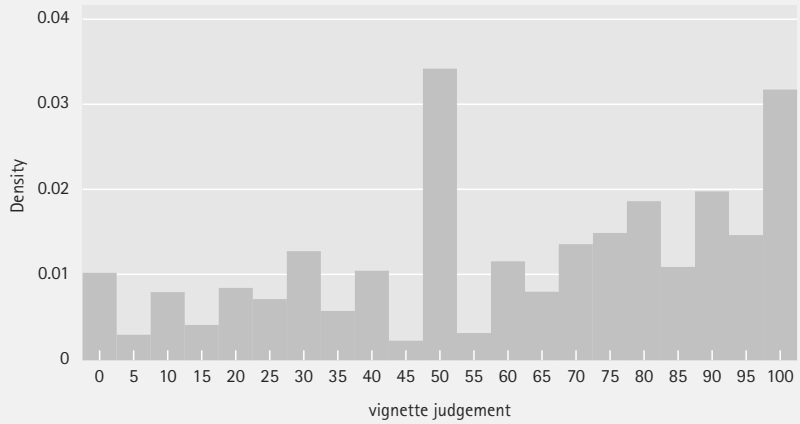
Variable	mean	sd	min	max	N
vignette judgement *waves 1 and 2*	62	30	0	100	3,925
wave 1	63	30	0	100	2,319
wave 2	60	29	0	100	1,606
participant group *waves 1 and 2*	0.49		0	1	3,925
wave 1	0.47		0	1	2,319
wave 2	0.51		0	1	1,606
living in new federal state *waves 1 and 2*	0.18		0	1	3,925
wave 1	0.21		0	1	2,319
wave 2	0.15		0	1	1,606
partner fulltime employed *waves 1 and 2*	0.77		0	1	3,925
wave 1	0.74		0	1	2,319
wave 2	0.81		0	1	1,606
child under 6 in household *waves 1 and 2*	0.18		0	1	3,925
wave 1	0.21		0	1	2,319
wave 2	0.13		0	1	1,606
under pressure *waves 1 and 2*	0.54		0	1	3,925
wave 1	0.57		0	1	2,319
wave 2	0.50		0	1	1,606
tertiary education *waves 1 and 2*	0.42		0	1	3,925
wave 1	0.39		0	1	2,319
wave 2	0.46		0	1	1,606
age (in years) *waves 1 and 2*	42	6.4	25	60	3,925
wave 1	43	6.5	25	58	2,319
wave 2	41	6.2	27	60	1,606
duration of interruption (in years) *waves 1 and 2*	11	6.5	0	30	3,925
wave 1	11	6.5	0.17	29	2,319
wave 2	10	6.6	0	30	1,606

6.5 Results

6.5.1 Descriptive results

Our dependent variable is how likely a woman would be to accept a given job offer as evaluated by the respondent. The job-acceptance scale ranged from 0 per cent to 100 per cent.[43] Figure 6.2 presents the distribution of the dependent variable.

Figure 6.2: Distribution of the vignette judgements



Source: Online supplement evaluation study 'Perspektive Wiedereinstieg'.

The results are consistent with other empirical findings: the typical acceptance rate of job offers is rather high and often varies between 80 per cent and 100 per cent. One peak is visible at 50 per cent, indicating that some women were made inconclusive judgements about the presented job offer. The other peak is visible at 100 per cent, indicating that some women were absolutely positive about accepting this job offer. However, approximately 30 per cent of the judgements denoted an acceptance probability of less than 50 per cent, indicating variability among the vignette dimensions and, thus, on the re-entry intention.[44] This supports Rossi and Anderson's (1982) argument that vignettes are less prone to social desirability and opposes Eifler's findings (2007, 2010) that self-reported behaviour from vignette experiments exhibits a too-positive result compared with the actual behaviour.

43 The variable is unevenly distributed, so we alternatively used an 11-point scale. The results are robust with regard to different specifications of the dependent variable. Although the variable itself is not normally distributed, the standardised level-1 residuals appear normal and are not in violation of the assumption of normal sampling distributions of the residuals (see Rabe-Hesketh and Skrondal 2008: pp. 125). The results are available upon request.

44 The slider was originally set to 0 to make sure that respondents had to move the slider to a different value.

6.5.2 Model specification

The results of our multilevel model are presented in Table 6.2.[45] In Model 1, we estimate an empty model without covariates that includes the multilevel structure. Subsequently, in Model 2, we included the vignette characteristics, and in Model 3, we included the individual characteristics. The results of the vignette characteristics remain stable, indicating no serious problem with the model specification. Finally, we question whether respondents from the participation and comparison group judge the vignettes similarly. The results of a Hausman test (see Rabe-Hesketh and Skrondal 2008: pp. 122) reveal that the error variance on the vignette level is homogenous; thus, all respondents follow a similar strategy. This is not surprising because the sample consists of a rather homogenous group of women.[46] In summary, the estimation by random intercept models seems to be the appropriate strategy for our purpose.

6.5.3 Test of hypotheses

Table 6.2 (Model 3) presents the results of the final random intercept model controlling for individual characteristics. Coefficients with a negative sign indicate a lower probability of re-entering the labour market as the independent variable increases, while a positive sign indicates a higher probability.

Table 6.2: Random intercept models for women, empty model, vignette model and full model

Dependent variable vignette judgment (0–100 per cent)	Model 1 Empty model	Model 2 +Vignette characteristics	Model 3 +Individual characteristics
vignette level variables			
phase: ref. already searching for some time			
phase: just started		-0.639	-0.636
		(0.633)	(0.632)
situation: ref. some applications left			
situation: no open applications left		2.210***	2.214***
		(0.635)	(0.633)
training: ref. according to training/abilities			
training: slightly over-qualified		-3.423***	-3.421***
		(0.780)	(0.779)
training: clearly over-qualified		-8.745***	-8.744***
		(0.779)	(0.778)

45 First, we address the question of whether a multilevel modelling strategy is indeed necessary. To answer this question, we performed a Likelihood-ratio-test of the empty multilevel model against a linear regression, a Lagrange-Multiplier test (Rabe-Hesketh and Skrondal 2008: p. 70) and an F-test testing for unexplained between-cluster heterogeneity, as proposed by Wooldridge (2002). Those tests reveal that the multilevel approach is necessary and that a mere clustering of the observations and calculating robust standard errors would not be sufficient and would lead to biased results.

46 The results are available upon request.

Table 6.2 continued

Dependent variable vignette judgment (0–100 per cent)	Model 1 empty model	Model 2 +vignette characteristics	Model 3 +individual characteristics
volume of work: ref. according to wishes			
volume of work: more than planned		-15.37***	-15.37***
		(0.782)	(0.780)
volume of work: less than planned		-6.692***	-6.693***
		(0.780)	(0.778)
commuting time: ref. 15 minutes			
commuting time: 30 minutes		-7.537***	-7.536***
		(0.783)	(0.781)
commuting time: 45 minutes		-22.41***	-22.40***
		(0.776)	(0.774)
wage: ref. according to previous job			
wage: 10 per cent less		-5.185***	-5.191***
		(0.784)	(0.783)
wage: 30 per cent less		-18.38***	-18.40***
		(0.779)	(0.777)
working hours: ref. flexible			
working hours: agreed upon with supervisor		-1.758***	-1.752***
		(0.780)	(0.777)
working hours: fixed		-8.725***	-8.716***
		(0.779)	(0.777)
individual level variables			
partner fulltime employed ref. partner less than fulltime employed			2.784
			(2.243)
child under 6 in household ref. no			1.098
			(2.607)
age (in years)			-0.067
			(0.186)
under pressure ref. not under pressure			4.163*
			(1.884)
tertiary education ref. no			4.318*
			(1.792)
duration of interruption (in years)			0.174
			(0.176)
cohort 1 ref. cohort 2			4.096*
			(1.743)
living in new federal state ref. old federal states			2.787
			(2.352)
participation group ref. comparison group			-2.158
			(1.763)
constant	61.73***	93.97***	86.64***
	(0.896)	(1.425)	(7.530)
random intercept standard deviation	15.90***	16.61***	16.40***
	(0.710)	(0.678)	(0.675)
level 1 residual standard deviation	25.05***	19.80***	19.76***
	(0.298)	(0.236)	(0.235)
rho	0.287	0.413	0.408
chi²	691.22	1,264.51	1,229.00
individuals	395	395	395
observations	3,925	3,925	3,925

Random intercept models obtained by ML (Maximum-likelihood-estimation); Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

First, we test hypothesis 1. The effect of the wage loss is highly significant and exhibits the expected direction. An anticipated wage loss of 10 per cent reduces the probability of re-entry by approximately 5 percentage points; a 30 per cent wage loss drastically decreases the re-entry probability by 18 percentage points. Thus, we can confirm hypothesis 1 and conclude that the higher the wage reduction compared with the job held prior to the interruption, the lower the preference for accepting the job offer.

Regarding the relevance of the other non-monetary characteristics and testing hypothesis 2, we observe the following results: receiving a job offer for a job for which one is clearly overqualified compared with an offer for a job that is in accordance with one's training and abilities decreases the re-entry probability by approximately 9 percentage points. However, a job offer for which one is only slightly overqualified decreases the acceptance probability significantly, by approximately 3 percentage points, which is different from our initial expectation. Overall, we find some support for hypothesis 2 with respect to the level of qualification. Mothers have a significantly lower preference for jobs that are slightly below their level of initial qualification. This lower preference is even more pronounced for jobs that are clearly below their level of initial qualification.

With respect to hypotheses 3 and 4, which examine characteristics related to temporal flexibility, we find that a job offer including more working hours than originally planned decreases the re-entry probability by 15 percentage points relative to a job offer containing as many hours as originally planned. Additionally, fewer working hours than planned decreases the re-entry probability by 7 percentage points. Compared to flexible working hours, fixed working hours decrease the re-entry probability by 9 percentage points, while working times that can be agreed upon with the direct supervisor decrease this probability by 2 percentage points. Both of the effects related to temporal flexibility are highly significant. In summary, we find support for hypotheses 3 and 4. Both the volume of work and the flexibility of the working hours have a significant influence on job offer acceptance.

Commuting time is assumed to contain a monetary and a non-monetary component and its impact is tested in hypothesis 5. A commuting time of 30 minutes decreases the re-entry probability by 22 percentage points relative to a commuting time of 15 minutes; a commuting time of 45 minutes decreases this probability by 7 percentage points. This value is the highest for all the dimensions under study. Thus, hypothesis 6 can also be confirmed: a longer commuting time decreases job-acceptance preferences.

Concerning the control variables on the individual level, we find the following: Compared to women who are not under pressure, women under pressure are more likely to accept the job offer. This is consistent with our general expectations that

women who have registered as unemployed or have a low family income are less reluctant to accept a job offer. Additionally, holding a tertiary education degree generally increases the re-entry probability. This is consistent with the findings of previous research from life course studies (e.g. Grunow, Aisenbrey and Evertsson 2011) and assumptions from human capital theory that women holding higher levels of education intend to interrupt for a shorter period. Furthermore, women from the first cohort have a significantly higher re-entry probability than women from the second cohort. This can be explained by the fact that women from the first and second cohort are recruited from the same geographical areas. It can be expected that women with increased need for a job participated in the programme earlier. For the comparison group, this can ultimately be explained by the better economic situation in 2011 compared with 2010. Surprisingly, the employment status of the partner, whether a child under 6 lives in the household and the duration of the interruption do not matter. This can be attributed to the homogenous group under study. A majority of the respondents have a partner but no children below 6 years old in the household and have been inactive on the labour market for several years. Also, no age effect could be detected. Finally, living in the new federal states and belonging to the comparison group do not matter. Therefore, although there are still large differences with respect to females and especially mothers' labour force participation (Kreyenfeld and Geisler 2006; Hanel and Riphan 2012) and differences with respect to attitudes towards female employment and employment re-entry (Drasch 2011b), women from the old and new federal states at least have similar attitudes towards relevant job characteristics.

Hypothesis 6 addresses the question of the presence of a compensating wage differential (CWD) for the group under study. Empirically, this hypothesis means that on one hand the direct monetary compensation for the offered job has a significant influence, but on the other hand other non-monetary characteristics also have to be relevant and positive characteristics should influence the re-entry probability positively. In our study, we find a highly significant influence of the most direct monetary measure of job characteristics, the financial compensation for work, but also a highly significant influence of almost all other characteristics containing non-monetary aspects of the financial compensation. Therefore, we find support for hypothesis 6 that besides wages, other characteristics also play a role in the decision to accept a job offer and mothers accept reduced wages for better job characteristics. The idea of compensating wage differentials indeed seems to exist for women with family-related employment interruptions.

With respect to the control vignette characteristics, the results of Table 6.2 show that for the respondents in our study, the search phase is not important. The search phase has no influence ontheir re-entry decision. Additionally, the

relative importance of this dimension is rather low, and it explains little of the total variance. This finding can be attributed to the specific situations of the women under study. Those women are often inactive in the labour market for several years and additional search time is no longer important. For a different group under study, e.g. unemployment benefit recipients, this dimension might be more important. We find that the availability of the job offers influences the acceptance rate. In a situation where the re-entrant has no remaining open job applications, there is a higher probability that she will accept a job offer. The relative importance of this dimension is again low. This finding also reflects that mothers are generally less willing to move and therefore have a higher probability of accepting a job once the availability of jobs becomes restricted in their geographical search radius.

Figure 6.3 also provides a graphical display of the results of the estimation. Here, the CWD idea becomes visible. For example, it does not matter whether a woman had just begun to apply for jobs; her acceptance rate is only 0.6 percentage points less than in the reference scenario. However, if a commuting time of 15 minutes is compared with the commuting time of 45 minutes used in the reference scenario, the acceptance rate is 22.4 percentage points less. This acceptance rate is diminished by an additional 5 percentage points if the wage level is 10 percentage points lower than that of the previous job.

Figure 6.3: Reference scenario with 'favourable' job characteristics

Reference categories: reference categories: phase: already searching for some time/situation: some applications left/training: according to training/abilities/working hours: according to wishes/commuting time: 15 minutes/net-salary: equivalent to previous job/flexibility: flexible working hours. Individual characteristics controlled for.

Source: Online supplement evaluation study 'Perspektive Wiedereinstieg'.

The results with respect to the relative importance of the dimensions are presented in Table 6.3. We propose that for the group under study, individual characteristics related to temporal flexibility are more important than monetary characteristics. We find that the relative importance of the commuting time is the highest of all of the dimensions, explaining 38 per cent of the total variance of the characteristics on the vignette level. However, the relative importance of the wage loss is also high, with a share of variance of 28 per cent of the total variance explained by the vignette characteristics. In addition, the relative importance of the volume of work dimension is high; approximately 19 per cent of the variance on the vignette level can be explained by this dimension. In contrast, the relative importance of the level of training dimension is comparatively low, explaining 8 per cent of the total variance. Also, the flexibility dimension only explains 6 per cent of the total variance, approximately equivalent to that explained by the training criterion.[47] In summary, we find mixed evidence regarding hypothesis 7. On the one hand, it seems that the temporal components of the job, namely commuting time and the volume of work, indeed matter for the group under study, although the characteristics directly related to the monetary compensation of a job are important as well. On the other hand, the level of training, a characteristic that can only be linked indirectly to the monetary compensation and the flexibility dimension seem less relevant.

Table 6.3: Relative importance of the dimensions

Variable	Variance explained	Significance level of partial correlations
phase: just started	0.00	0.445
situation: no open applications left	0.00	0.006
training: slightly over-qualified		0.000
training: clearly over-qualified	0.08	0.001
volume of work: more than planned		0.000
volume of work: less than planned	0.19	0.000
commuting time: 30 minutes		0.000
commuting time: 45 minutes	0.38	0.000
wage: 10 per cent less		0.000
wage: 30 per cent less	0.28	0.000
working hours: agreed upon with supervisor		0.109
working hours: fixed	0.06	0.000
total variance explained	0.24	

47 Because the dimensions concerning job characteristics have the same number of levels, they can be compared with each other.

Finally, we address whether there are differences with respect to women with different characteristics. Foremost, we assume that whether the woman is under pressure to find a job, e.g. because she is registered as unemployed or because the overall household income is low, is important. We therefore estimate two separate models, one for women not under pressure (Model 4) and another for women under pressure (Model 5), and tested whether the coefficients differ significantly.[48] In both models, all job characteristics are significant with one exception: working hours agreed upon with the supervisor (as opposed to flexible working hours) do not reduce the acceptance probability any more than in the full model. This finding is difficult to interpret but ultimately can be attributed to smaller sample sizes.

In addition, bearing in mind that women under pressure have a significantly higher probability of accepting the job offer in the full model, we can conclude that in Model 5 (women under pressure), a number of vignette characteristics decrease the acceptance probability less than in model 4 (women not under pressure). For example, a commuting time of 45 minutes compared with 15 minutes decreases the acceptance of the job offer by 25 percentage points for women who are under pressure to find a job. Conversely, a commuting time of 45 minutes only decreases the acceptance probability by 19 percentage points for women not under pressure. This difference is highly significant. Significant but less pronounced differences can also be found for a commuting time of 30 minutes compared with 15 minutes. When examining wage reductions, we arrive at a similar conclusion. Wage reductions are significantly less important for women under pressure. For women under pressure, a 10 per cent wage decrease lowers the acceptance probability by 4 percentage points, while a 30 per cent decrease lowers the acceptance probability by 18 percentage points. In contrast, for women not under pressure, these numbers are 7 percentage points lower for a 10 per cent wage decrease and 19 percentage points lower for a 30 per cent wage decrease. In Table 6.3, both wage decrease and commuting time are shown to be relatively important compared to the other characteristics. Furthermore, working more than planned is more important for women not under pressure; it decreases the acceptance probability by 17 percentage points as compared to 14 per cent for women under pressure. The difference between the coefficients is again highly significant. However, the effects of the other characteristics are less pronounced and/or not significant.

In summary, these results partially support hypothesis 8: at least some of the job characteristics are less important for women under pressure. Also, in Model 4,

48 We also estimated an interaction model including interactions with pressure. The results are similar and available upon request.

the search phase and search situation are significant; this result is in contrast to that of Model 5, the model for women under pressure.

Additionally, we tested for heterogeneities between other individual characteristics, such as the level of training or whether a child under six or a male earner is present in the household. Interactions between the vignette dimensions and the individual characteristics were also considered. We do not find significant interactions. Additional robustness checks examining different sub-groups, such as women living in the old and new federal states, women who belong to the participant or control group and women from the earlier and later wave, reveal that there are some differences between the sub-groups that are not substantially meaningful because the magnitude and the relative importance of the dimensions remain similar.[49]

Table 6.4: Random intercept models for women, not under pressure and under pressure

Dependent variable vignette judgment (0–100 per cent)	Model 4 Not under pressure	Model 5 Under pressure	chi^2-test (p-values)
vignette level variables			
phase: ref. already searching for some time			
phase: just started	-1.851*	0.352	0.0472
	(0.944)	(0.841)	
situation: ref. some applications left			
situation: no open applications left	2.768**	1.592	0.0516
	(0.947)	(0.842)	
training: ref. according to training/abilities			
training: slightly over-qualified	-3.053**	-3.527***	0.0000
	(1.162)	(1.036)	
training: clearly over-qualified	-10.87***	-6.825***	0.3022
	(1.162)	(1.103)	
volume of work: ref. according to wishes			
volume of work: more than planned	-17.19***	-13.78***	0.0000
	(1.168)	(1.036)	
volume of work: less than planned	-6.027***	-7.259***	0.0591
	(1.163)	(1.035)	
commuting time: ref. 15 minutes			
commuting time: 30 minutes	-9.218***	-6.089***	0.0000
	(1.162)	(1.045)	
commuting time: 45 minutes	-25.53***	-19.78***	0.0000
	(1.157)	(1.031)	
wage: ref. according to previous job			
wage: 10 per cent less	-6.683***	-4.104***	0.0002
	(1.167)	(1.044)	
wage: 30 per cent less	-19.22***	-18.14***	0.0000
	(1.162)	(1.035)	

49 The results are available upon request.

Table 6.4 continued

Dependent variable vignette judgment (0–100 per cent)	Model 4 Not under pressure	Model 5 Under pressure	chi²-test (p-values)
working hours: ref. flexible			
working hours: agreed upon with supervisor	-1.473 (1.163)	-1.903 (1.037)	0.6717
working hours: fixed	-9.993*** (1.164)	-7.483*** (1.035)	0.0000
individual level variables			
partner fulltime employed ref. partner less than fulltime employed	10.30* (5.082)	-0.457 (2.652)	
child under 6 in household ref. no	3.736 (3.606)	0.358 (3.670)	
age (in years)	-0.363 (0.297)	0.062 (0.242)	
tertiary education ref. no	1.836 (2.429)	5.004 (2.645)	
duration of interruption (in years)	-0.0672 (0.267)	0.323 (0.236)	
cohort 1 ref. cohort 2	2.398 (2.459)	3.659 (2.545)	
living in new federal state ref. old federal states	3.334 (3.661)	0.706 (3.129)	
participation group ref. comparison group	0.182 (2.422)	-1.241 (2.561)	
constant	98.69*** (12.13)	82.71*** (9.744)	
random intercept standard deviation	14.55*** (0.911)	17.39*** (0.948)	
level 1 residual standard deviation	19.99*** (0.351)	19.29*** (0.312)	
Rho	0.346	0.448	
chi²	433.34	787.06	
Individuals	182	215	
Observations	1,802	2,123	
Observations	1,802	2,123	

Random intercept models obtained by ML (Maximum-likelihood-estimation); Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.6 Conclusions and discussion

This chapter sheds light on the circumstances under which women return to the labour market after a family-related employment interruption. More precisely, we focus on job characteristics that have an influence on the re-entry decision. From a theoretical point of view, this chapter uses Rosen's idea (1986) of compensating wage differentials (CWD) that was brought into the field of sociology by England (1992). This idea assumes that individuals trade wages for better job characteristics.

We can provide some additional support for the CWD idea. The results of this study show that besides those job characteristics that are related to financial compensation, such as wages, the characteristics that reflect the situation in the prospective job are also important in shaping the re-entry decision. Besides commuting time, however, wage losses play the most important role of all the characteristics we examined in our survey. Additionally, characteristics that have an influence on the temporal flexibility of the mother, such as working hours, are more relevant than characteristics related to the job content.

The finding that the level of over-qualification dimension is relatively unimportant can be explained by the fact that mothers tend to search for jobs that are less demanding. This is consistent with Becker's (1991) assumption that the priorities of married women may shift from work to the family sphere. The results with regard to the flexibility dimension can be linked to planning security. As long as the working hours fit the schedule of the mother, it does not matter whether they are fixed, negotiable with the supervisor or flexible. Indirectly, this result means that the mother probably assumes that the fixed working hours fit into her schedule.

We also find evidence that women under pressure have a different acceptance probability than women not under pressure. Concerning other heterogeneities, little evidence is found. The characteristics of the search process itself were less relevant for the group under study (long-time inactive mothers) than other variables; these included how long the mothers had already been searching and whether they still had open applications remaining.

Using a factorial survey provides a different method for assessing the relevance of certain job characteristics. Admittedly, the results are limited to a comparison of the characteristics under study, but they nevertheless provide a fruitful starting point from which this question can be addressed in more detail. The hypotheses could also be tested under different situations, e.g. with unemployment benefit recipients in Germany for whom eventual wage losses are even less relevant. This suggestion already indicates the limitations of the study: no gold standard is available, and it is not possible to compare the results from the women under study with the results from a larger population survey with a broader target group. Thus, the results are exemplary. Also, the selected job characteristics should be seen as exemplary characteristics. Presumably, other characteristics also matter. Another limitation is that all returners receive the same number of job offers, which is of course not the case in reality. However, the design of the factorial survey with its fictive character also possesses an advantage: it avoids the selection problems often connected with realised versus unrealised decisions (Nisic and Abraham 2009).

A final methodological remark concerns the design of the factorial survey. Survey methodology and computer-based programming of survey interviews have made rapid progress and provide the opportunity to implement tailored factorial surveys in large-scale studies. With this method, we note two other possibilities: First, vignettes could be utilised when respondents are in a specific decision-making situation. Second, and perhaps more interesting, vignette scenarios could be adapted to the respondents' previous answers. Implementing such a process is a task for future research.

This research has some practical implications as well. It emphasises, as many other descriptive studies have also, that the monetary compensation is not all that matters; the jobs also have to be family-friendly to attract future workforce potential. The results show that in our study, prospective female re-entrants are not willing to accept some jobs at any price. More precisely, they are not willing to accept a longer commuting time, which may also be related to their family obligations. According to our research results, jobs that allow for temporal flexibility are especially desirable. Thus, to support mothers, family and employment politicians, organisations and employers must continue to develop flexible working arrangements that allow for a better reconciliation of work and family.

7 Summary and concluding remarks

First, I will briefly summarise the research questions and main results of chapters 2 to 6. Then, I will discuss the limitations of the thesis and end with some suggestions for future research.

7.1 Summary of the main findings and answers to research questions

Chapter 2 dealt with educational attainment and employment re-entries over the past three decades in West Germany. This chapter is based on an article which is accepted for publication in the *European Sociological Review.* Cross-sectional studies showed that in West Germany, women with different levels of educational attainment participate differently in the labour market (Kreyenfeld, Konietzka und Böhm 2007a). In chapter 2, I examined one potential underlying mechanism: the re-entry of mothers to the labour market after a period of inactivity. I argued that besides societal changes, the reforms in parental leave legislation could be responsible for the educational divide in mothers' employment. Hypotheses were derived from human capital theory assuming rational behaviour of women. Using retrospective life course data from the IAB study ALWA, I found evidence that women with different levels of educational attainment had different re-entry patterns. Furthermore, parental leave schemes played a crucial role in re-entry. Some evidence of educational polarisation of re-entry behaviour is found after the year 1992.

In chapter 3, I first examined what family related employment interruptions for women in the FRG (Federal Republic of Germany) and the GDR (German Democratic Republic) looked like in the period prior to German reunification. This chapter is based on an article which appeared in an edited volume. Furthermore, I investigated how employment interruptions developed after the German reunification in the old and new states and questioned whether a convergence of re-entry behaviour could be observed. The following research question was addressed: which factors are more important: attitudes towards the employment of mothers, which were transferred through socialisation in childhood and adolescence, or institutional arrangements shaped by parental leave regulations? Based on data from the IAB-ALWA study, the results showed that even twenty years after the German reunification, significant differences between women in East and West Germany were found to exist with respect to family related employment interruptions. These interruptions were subject to strong institutional control. Women who were raised in the GDR and moved to

one of the old federal states after the reunification do not behave differently than West German women. This result suggests that institutional arrangements, including for example also child care availability, are more important to re-entry behaviour than is socialisation. However, the results must be interpreted carefully: it could be that East German women's willingness to move was also influenced by socialisation, which could bias the results.

Chapter 4 is based on an article co-authored by Britta Matthes and was published *Quality & Quantity. International Journal of Methodology*. The chapter examined more closely one of the methodological innovations used in the IAB-ALWA study: the data revision module, which was designed to make retrospective life course data more reliable. This data revision module was directly integrated into the interview. It used general principles designed for event history calendars (EHC), which had proven to be a useful tool to collect retrospective autobiographical life course data. One limitation with regard to large-scale surveys is that they are only standardised to some extent. However, in the IAB-ALWA study, a modularised retrospective CATI design was combined with EHC. Also, insights from cognitive psychology were applied. The data revision module stimulated the respondents' memory retrieval by detecting temporal inconsistencies, such as gaps, and overlapping or parallel events. By comparing the uncorrected data with the final data after revision, we investigated to what extent the application of this data revision module improves data quality – or, more precisely, the time consistency and dating accuracy of individual reports. Overall, the data revision module that was incorporated as a recall aid in the IAB-ALWA survey improved the completeness of the data and also the dating accuracy. Individual and event specific characteristics mattered in relation to initially forgetting and then adding an episode. This picture was different in the case of correcting an episode with respect to its dating. Here, only event specific characteristics were crucial.

To underline the relevance of chapter 4 for subject matter analysis, chapter 5 contains remarks related to the quality of the data concerning parental leave and gap episodes as homemaker. It showed that the results are robust concerning different specifications of the dependent variable.

Chapter 6 is based on an article co-authored by Martin Abraham. It sheds light on the circumstances under which women would return to the job market after a family related employment interruption. Besides job characteristics related to financial compensation, such as wages, characteristics were included that reflect the situation of the prospective job. We assumed that women with children seek jobs that are less demanding and effort intensive and are more compatible with the demands for their home responsibilities. Thus, in line with the theory on compensating wage differentials (Rosen 1986; England 1992), we assumed that

mothers accept reduced wages for job amenities thus better job characteristics. Empirically, the question was examined by using a factorial survey as a quasi-experimental design. Respondents were presented with a number of hypothetical scenarios, called vignettes, which contained job offers. Respondents had to decide how likely they are to accept this job offer. This design enables disentangling the causal influence of the independent variation of a limited number of dimensions (characteristics) on the decision-making behaviour of individuals. Vignettes are therefore particularly suitable for tracing decision behaviour in complex situations. The results suggested that a trade-off between wages and better job characteristics indeed takes place, indicating that mothers and characteristics connected to the time constraints of women seem to be more important than other characteristics of the job. However, there were differences between women who are under pressure to find a job and those who are not. Women under pressure were much less reluctant to accept unfavourable job characteristics. In sum, job amenities seem to play an important role for mothers in the process of re-entering the labour market.

7.2 Limitations of the thesis and suggestions for future research

By examining several aspects of family related employment interruptions and re-entries of women in Germany, this study offered a number of substantial and methodological research results. Complementary to research conducted in the early 1990s and 2000s (e.g. Kurz 1998), it provides current research results for Germany. It thus fits well into the ongoing discussion in this particular field of research (e.g. Aisenbrey, Evertsson and Grunow 2009; Grunow, Aisenbrey and Evertsson 2011).

However, this study is only a first step towards explaining the employment dynamics of women with children, and future research can be extended in several directions. First, future research would benefit from examining the interrelated processes of fertility and employment simultaneously. Second, short and long-term monetary as well as non-monetary consequences of employment interruptions for the future career would be interesting to address. Third, including the family context is a necessary step in future research because individuals and their decisions are embedded in the broader context of a family. Forth, the impact of the family policy changes in Germany in 2007 provides an interesting field on how to extent research as presented in this thesis because this reform has often been labelled as a paradigm shift in German family policy.

8 Zusammenfassung auf Deutsch

Untersuchungsgegenstand dieser Dissertation sind die Mechanismen, die den Erwerbsquoten von Müttern zugrunde liegen, insbesondere die Wiedereinstiege in den Arbeitsmarkt nach einer familienbedingten Erwerbsunterbrechung. Im einleitenden Kapitel 1 stelle ich meine Motivation für die vorliegende Arbeit dar. Mein Ausgangspunkt ist die Annahme, dass die Balance zwischen Beruf und Familie in der heutigen Arbeitswelt immer noch schwierig ist.

Die Untersuchung des Wiedereinstiegsverhaltens von Müttern geschieht in der vorliegenden Dissertation aus einer theoretischen Perspektive, die sowohl weite als auch enge Theorien rationaler Wahl mit einbezieht. Als konzeptionellen Rahmen verwende ich die Lebensverlaufsperspektive. Auf der Mikroebene werden verschiedene Handlungstheorien kurz dargestellt. Neben der inhaltlichen Untersuchung des Wiedereinstiegsverhaltens stehen auch methodische Aspekte im Zentrum der vorliegenden Arbeit. Zum Abschluss des Kapitels werden die leitenden Forschungsfragen aufgezeigt und der Aufbau der Arbeit beschrieben.

Kapitel 2 widmet sich der Frage, ob sich Frauen mit unterschiedlichen Bildungsniveaus hinsichtlich ihres Wiedereinstiegsverhaltens unterscheiden, und ob sich das Wiedereinstiegsverhalten im Zeitverlauf verändert hat. Dieses Kapitel basiert auf einem Artikel, der zur Veröffentlichung in der Zeitschrift *European Sociological Review* angenommen ist.[50] Die Forschungsfrage gründet sich darauf, dass sich die Erwerbsbeteiligung von Müttern in Westdeutschland stark nach deren Bildungsgrad unterscheidet (vgl. Kreyenfeld, Konietzka und Böhm 2007a). Die bisher vorliegenden Untersuchungen nutzen allerdings lediglich Querschnittdaten als Basis für ihre Analysen. Zudem ging in den vergangenen Jahrzehnten die Vollzeiterwerbsbeteiligung von weniger gebildeten Müttern am gravierendsten zurück, während die Gruppe besser gebildeter Frauen von diesem Rückgang weniger betroffen war. Deshalb untersuche ich einen Mechanismus, der diesen empirischen Ergebnissen möglicherweise zugrunde liegen könnte: der berufliche Wiedereinstieg von Müttern in den Arbeitsmarkt nach einer familienbedingten Erwerbsunterbrechung. Ich argumentiere, dass neben gesellschaftlichen Veränderungen auch die Reformen in der Gesetzgebung zu Erziehungszeiten für die bildungsspezifische Ungleichheitsentwicklung verantwortlich sein könnten. Die Ableitung der Hypothesen erfolgt unter anderem aus der Humankapitaltheorie und der Arbeitsangebotstheorie. Diese haben gemeinsam, dass sie eine rationale Handlungsweise der Frauen unterstellen. Mittels retrospektiver Lebensverlaufsdaten der IAB-ALWA Studie wird festgestellt,

50 Drasch, Katrin. forthcoming. Educational Attainment and Family Related Employment Interruptions in Germany: Do Changing Institutional Settings Matter? European Sociological Review. Online first 2012, 15 p. doi: 10.1093/esr/jcs076. With kind permission from Oxford University Press.

dass Frauen mit unterschiedlichem Bildungsniveau unterschiedliche Wiedereinstiegsmuster aufweisen. Zudem spielen Regelungen zu Erziehungszeiten eine entscheidende Rolle für den Wiedereinstieg. Zudem gibt es Anzeichen für eine bildungsspezifische Polarisierung des Wiedereinstiegsverhaltens nach dem Jahr 1992.

In Kapitel 3 wird der Frage nachgegangen, wie sich familienbedingte Erwerbsunterbrechungen aufgrund der Geburt von Kindern vor der Wiedervereinigung in der Bundesrepublik und der DDR gestaltet haben. Weiterhin wird untersucht, wie sich Unterbrechungen nach der Wiedervereinigung in den alten und neuen Bundesländern entwickelt haben, und ob eine Annäherung des Wiedereinstiegsverhaltens zwischen beiden Regionen stattgefunden hat. Dieses Kapitel basiert auf einem Beitrag in einem Sammelband.[51] Ich stelle die Forschungsfrage, welche Faktoren wichtiger sind: Einstellungen zur Erwerbstätigkeit von Müttern, die durch die Sozialisation in Kindheit und Jugend weitergegeben wurden oder die durch Elternzeitregelungen gestalteten institutionellen Rahmenbedingungen? Die Ergebnisse auf Basis der IAB-ALWA Studie zeigen, dass auch zwanzig Jahre nach der deutschen Wiedervereinigung deutliche Unterschiede zwischen Frauen in Ost- und Westdeutschland bezüglich der Dauer von familienbedingten Erwerbsunterbrechungen existieren. Familienbedingte Erwerbsunterbrechungen unterliegen dabei jedoch einer starken institutionellen Steuerung. Frauen, die in der DDR aufgewachsen sind und nach der Wiedervereinigung in den Westen gezogen sind, verhalten sich nicht anders als westdeutsche Frauen. Die deutet darauf hin, dass institutionelle Regelungen eine stärkere Bedeutung für das Wiedereinstiegsverhalten haben als Sozialisationsaspekte. Allerdings müssen die Ergebnisse mit einiger Vorsicht interpretiert werden. Es könnte sein, dass die Umzugsbereitschaft ostdeutscher Frauen ebenfalls durch Sozialisationsprozesse beeinflusst wird.

Kapitel 4 ist in Zusammenarbeit mit Dr. Britta Matthes entstanden und wurde in der Zeitschrift *Quality & Quantity* veröffentlicht.[52] Das Kapitel widmet sich der methodischen Frage, wie Lebensverlaufsdaten retrospektiv erhoben werden können, um das Erinnerungsvermögen von Befragten möglichst gut zu unterstützen. Biografische Kalender (EHC) haben sich dabei als ein nützliches Instrument zur Erfassung retrospektiver autobiografischer Lebensverlaufsdaten erwiesen. Problematisch ist allerdings, dass biografische Kalender nur zu einem gewissen Grad standardisiert werden können, was deren Einsetzbarkeit in großangelegten Bevöl-

51 Drasch, Katrin. 2011. Zwischen familiärer Prägung und institutioneller Steuerung. Familienbedingte Erwerbsunterbrechungen von Frauen in Ost- und Westdeutschland und der DDR. In Reproduktion von Ungleichheit durch Arbeit und Familie, Hrsg. Peter A. Berger, Karsten Hank und Angelika Tölke, 171–200. Wiesbaden: VS Verlag für Sozialwissenschaften. doi: 10.1007/978-3-531-94117-2_8.

52 Drasch, Katrin, und Britta Matthes. 2013. Improving Retrospective Life Course Data by Combining Modularized Self-Reports and Event History Calendars. Experiences from a Large Scale Survey. Quality & Quantity, 817–838. doi: 10.1007/s11135-011-9568-0.

kerungsumfragen einschränkt. Allerdings ist es möglich, in solchen Umfragen das modularisierte retrospektive CATI Erhebungsdesign mit einem biografischen Kalender zu einem Korrekturmodul zu kombinieren, welches Erinnerungsfehler bereits im Verlauf des Interviews aufspürt. Erinnerungsfehler können dann vom Interviewer gemeinsam mit den Befragten korrigiert werden. Dazu werden Erkenntnisse aus der Kognitionspsychologie genutzt. Das Korrekturmodul stimuliert das Erinnerungsvermögen des Befragten, indem es sowohl auf temporäre Inkonsistenzen, wie beispielsweise Lücken in berichteten Lebensverläufen, als auch auf überlappende und parallele Ereignisse hinweist. Dieser Ansatz wurde in der IAB-ALWA Studie verfolgt. Wir untersuchen, in welchem Ausmaß das Korrekturmodul die Datenqualität, insbesondere die zeitliche Konsistenz und die Datierungsgenauigkeit der einzelnen berichteten Ereignisse verbessert, indem wir die ungeprüften Daten mit den korrigierten Daten nach der Datenprüfung vergleichen. Insgesamt zeigt sich, dass das in die IAB-ALWA Studie implementierte Korrekturmodul die Vollständigkeit der Daten und auch die Datierungsgenauigkeit verbessert hat. Für das Hinzufügen einer Episode sind sowohl individuelle als auch ereignisspezifische Charakteristika relevant. Ein anderes Bild zeigt sich bei Datumskorrekturen, denn hier sind nur ereignisbezogene Charakteristika entscheidend.

Um die Relevanz der in Kapitel 4 angesprochenen Verfahren für die inhaltlichen Analysen aufzuzeigen, enthält Kapitel 5 Ausführungen zur Datenqualität der erhobenen Elternzeitepisoden und Lückenepisoden, die unter anderem Perioden einer Hausfrauentätigkeit beinhalten. Insgesamt zeigt das Kapitel, dass die Ergebnisse bezüglich ausgewählter Analysen auch unter Verwendung verschiedener Spezifikationen der abhängigen Variablen robust sind. Gleichgültig, ob unedierte Daten direkt aus der Befragung oder in einem aufwändigen Editionsprozess aufbereitete Daten verwendet werden – die Ergebnisse und Schlussfolgerungen bleiben ähnlich.

Kapitel 6 ist in Zusammenarbeit mit Prof. Dr. Martin Abraham entstanden und bislang noch nicht veröffentlicht. Das Kapitel beleuchtet die Umstände, unter denen Frauen nach einer familienbedingten Erwerbsunterbrechung in den Arbeitsmarkt zurückkehren würden. Neben der Entlohnung als monetäre Eigenschaft der Arbeitsstelle werden auch andere, nicht-monetäre Eigenschaften von Stellenangeboten untersucht. Es wird angenommen, dass Frauen mit Kindern Stellen suchen, die weniger anspruchsvoll und anstrengend sind und daher eher mit den Anforderungen der Familienarbeit kompatibel sind. Basierend auf der Theorie der kompensierenden Lohndifferentiale (Rosen 1986; England 1992) gehen wir davon aus, dass Mütter geringe Löhne akzeptieren, wenn sie dafür Tätigkeiten mit besseren nichtmonetären Stelleneigenschaften nachgehen können. Empirisch wird diese Frage mit Hilfe eines faktoriellen Surveys als quasi-experimentelles Design untersucht. Die Befragten werden mit einer Reihe von hypothetischen Szenarien, sogenannten

Vignetten, konfrontiert, die Stellenangebote mit bestimmten Stelleneigenschaften enthalten. Sie müssen daraufhin entscheiden, wie wahrscheinlich sie dieses Angebot annehmen würden. Diese Konstruktion ermöglicht, den kausalen Einfluss der unabhängigen Variation einer begrenzten Anzahl von Dimensionen (Eigenschaften) auf das Entscheidungsverhalten von Individuen zu messen. Vignetten sind daher besonders geeignet, um das Entscheidungsverhalten in komplexen Situationen nachzuzeichnen. Die Ergebnisse legen nahe, dass in der Tat eine Abwägung zwischen Löhnen und besseren, nicht-monetären Stelleneigenschaften stattfindet. Sie weisen zudem darauf hin, dass für Mütter Eigenschaften, die Einfluss auf das Zeitbudget haben, wichtiger sind als andere Stelleneigenschaften. Allerdings gibt es Unterschiede zwischen Frauen, die unter (finanziellem) Druck stehen, eine Stelle anzunehmen und diejenigen, die nicht unter Druck stehen. Frauen unter Druck zögern weniger, auch eine Stelle mit ungünstigen Stelleneigenschaften zu akzeptieren. Zusammenfassend scheinen nicht-monetäre Eigenschaften einer Stelle eine wichtige Rolle beim Wiedereinstiegsprozess von Müttern nach einer familienbedingten Erwerbsunterbrechung zu spielen.

Im Schlusskapitel 7 werden die zentralen Ergebnisse der Arbeit zusammengefasst. Zudem werden einige Einschränkungen der Arbeit diskutiert und Vorschläge für zukünftige Forschung gemacht. Diese beziehen sich auf eine gemeinsame Betrachtung der miteinander verbundenen Prozesse Fertilität und Erwerbstätigkeit, die kurz- und langfristigen Auswirkungen auf die berufliche Karriere von Müttern, die Bedeutung des Familienkontextes und die Folgen der 2007 durchgeführten Elterngeldreform.

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Arbeitskräftebedarf

Nachfrage, Rekrutierungsprozesse und Engpässe aus Sicht der Betriebe

Das Thema Fachkräftebedarf wird in Wissenschaft und Öffentlichkeit intensiv und kontrovers diskutiert. Der Bericht analysiert die Arbeitskräftenachfrage der Betriebe und versucht, aktuelle Engpässe auf dem Arbeitsmarkt zu identifizieren. Zunächst wird die Entwicklung der Betriebs- und Beschäftigungsstruktur sowie der offenen Stellen differenziert für verschiedene Teilarbeitsmärkte dargestellt. Weiterhin werden verschiedene Indikatoren diskutiert, die Hinweise auf Arbeitskräfteengpässe geben können. Insgesamt zeigen die Ergebnisse, dass in Deutschland derzeit kein allgemeiner, flächendeckender Fachkräftemangel besteht. Dennoch sind bestimmte Berufe, Regionen und Branchen zu erkennen, in denen die Engpässe zugenommen haben. Dies gilt etwa für Berufe aus dem Gesundheits- und Sozial-, aber auch dem Elektrobereich. Auf regionaler Ebene treten Fachkräfteengpässe am ehesten in den süddeutschen Bundesländern auf, im Branchenvergleich scheinen Engpässe vornehmlich in einzelnen Dienstleistungsbereichen zu bestehen.

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Der Arbeitskräftebedarf in Deutschland 2006 bis 2011

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It is still difficult for mothers in Germany to reconcile family life with employment. This becomes particularly apparent when mothers attempt to re-enter the labour market. Partly this varies very strongly according to level of education; partly legal regulations on parental leave play a decisive role. In addition, women in the Western part of Germany interrupt their employment for a longer time than women from the Eastern part of Germany – even twenty years after reunification. In the meantime, this appears to be more a result of different institutional regulations rather than differing socialisation. Finally, the re-entry of mothers into the labour market after interrupting their employment to have and look after children also seems to depend on the characteristics of the jobs offered. Here it becomes apparent that, along with pay, non-monetary characteristics also play an important role – especially those affecting one's personal time budget.

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